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Philadelphia Celebrates Rittenhouse Day

The 250th Anniversary of the Founding of the Paper Making Industry In America By William Rittenhouse Is Celebrated On Historic Paper Mill Run—Board of Paper Trade Association Meets.

PHILADELPHIA, Pa., July 15, 1940 — The 250th anniversary of the founding of the paper making industry in America at Germantown, Pennsylvania, by William Rittenhouse in 1690, was celebrated on Monday, July 1, "William Rittenhouse Day," under the auspices of the National Genealogical Society, of Washington, D. C. *Committee*: Max E. Hoyt, president; Lt. Col. Calvin I. Kephart, committee chairman; Milton Rubicam, corresponding secretary, the American Institute of Graphic Arts, of New York; Printing Anniversary Committee: Will Ransom, secretary, the 250th Anniversary Committee of Roxborough-Manyunk-Wissahickon, Philadelphia. Miles L. Frederick, publicity chairman, and the papermaking industry.

The exercises were held on Paper Mill Run, a branch of the historic Wissahickon Creek, on the approximate site of the first mill. Nearby is the house (now No. 207 Lincoln Drive, Fairmount Park, Philadelphia) which was erected in 1707 by William Rittenhouse, and in which his distinguished great-grandson, David Rittenhouse, LL.D., F.R.S. (1732-1796), the astronomer, was born.

Address Delivered by H. S. Foster

The principal address was delivered by Hubert S. Foster, advertising director, the Mead Corporation, the parent firm of the Dill & Collins Paper Company, which traces its origin to the Rittenhouse firm. The invocation was pronounced by the Rev. Howard Landen, pastor of the Mennonite Church of Germantown, Philadelphia, and the benediction by the Rev. S. G. Von Bosse, pastor of Bethany Lutheran Church, Roxborough, Philadelphia. Milton Rubicam read messages of greeting on behalf of the National Genealogical Society and the American Institute of Graphic Arts. The honorary chairman of the occasion was H. H. Hanson, president of W. C. Hamilton & Sons, papermakers, of Miquon, Montgomery county, Pennsylvania.

A feature of the celebration was the actual making of paper by the ancient methods employed by the Rittenhouses. This was an exhibit put on by W. C. Hamilton & Sons. Many descendants of William Rittenhouse attended the exercises.

The regularly scheduled meeting of the Board of Governors of the Philadelphia Paper Trade Association was held at 12:30 on Wednesday, last, at the Down Town Club. Nat Saxe, president, announced the appointment of George K. Hooper, president of Hooper Paper & Twine Co. and Paper & Cordage Association of Phila., as chairman of the Planning Committee, the purpose of which is to create renewed interest in the activities of the National Association and enliven future meetings of the Association with many new and novel features. Serving with Chairman Hooper on this new Planning Committee are Edward Walter of Walter-Wilcox-Furlong, and C. A. Wilder of Wilder Bros. Co. Already Mr. Hooper and his committee have swung into action with a concerted plan to increase the membership, the goal for which he has set at 100.

LeRoy Bishop of Raymond and McNutt Paper Company, and Nat Saxe of Saxe Paper Company, have been appointed delegates to the convention of the National Paper Trade Association, to be held in Chicago in September. Mr. Bishop will represent the fine paper division and Mr. Saxe the wrapping paper group.

Frank Dubin of Dubin Paper Company, Inc., was appointed chairman of the new Certification Committee, which plan originated with the National Association, and requires the various jobbers to certify the quality of all the items handled by them.

Paper Prices Lower Than Justified

Prices on fine and coarse paper in this area have advanced a little but not as much as is justified. We are informed that the mills have not asked for any increase in their prices, which they very properly are entitled to in order to keep pace with increased cost of manufacturing their products. It is the consensus of opinion here that the manufacturers are deserving of a great deal of credit for not capitalizing on prevailing conditions. A case is cited where one mill, behind in its orders, steadfastly refused to quote on an order of 10,000 reams of tissue from South America. Their capacity of necessity is limited and because of this and the fact that they wish to protect their customers in town, they declined the order rather than take advantage of the situation.

Construction Work Resumed on Fox River

High Water Which Delayed Construction of New Power Plant and Government Dam Recedes and Work On These Projects Has Been Resumed—Estate of the Late George A. Whiting Is Valued At $3,000,000.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., July 15, 1940 — Construction projects in the paper mill area along the Fox River which have been delayed because of high water conditions have been resumed. One of these is the new municipal power plant at Kaukauna, Wis., utilizing the water power of the former Patten Paper Company. Unusually heavy rains in June sent the river on a rampage which overflowed coffer dams, flooded excavations, and made work impossible for two weeks.

The power dam and tail race will now be completed so the new plant can be ready for operation later this year.

Operations were likewise suspended on the new government dam at Appleton, Wis., replacing an obsolete one. It was necessary to remove the equipment until the floods subsided. Known as the "upper" dam, it is one of the largest on the Fox River, controlling the flow at Appleton. The work is being done by C. R. Meyer and Sons Company of Oshkosh, Wis.

Riverside Completes Addition to Mill

Completion of the fourth story addition to the Riverside Paper Corporation's mill at Appleton, Wis., is expected about August 1. The floor has been completed and most of the supporting walls are in place. Work also is under way on the roof. The addition is 78 by 88 feet, nine feet high, and is built of tile and concrete. The estimated cost is $13,500. The added floor space will be used mostly for storage, according to E. C. Hilfert, general manager.

Opposes Lower Coal Rates

Lower rates on coal shipped largely to paper mills of Wisconsin Rapids and Stevens Point are opposed by the Wisconsin Coal Bureau, of which W. F. Ehmann is traffic manager. The reduction was proposed by the Green Bay and Western Railroad on coal and coke shipments from Green Bay, Wis., to Wisconsin Rapids and Stevens Point, bringing the rate down from $1.37½ per ton to $1.25. The objections were submitted to the Wisconsin Public Service Commission at a hearing at Madison, Wis. Mr. Ehmann contends this reduction will take business away from coal dock operators at Milwaukee, Wis., and favor the operators at Green Bay, Wis. Mr. Ehmann made the statement during the hearing that "eventually" natural gas would replace coal and coke for industrial and home purposes. (A movement is now under way in Milwaukee to pipe natural gas to Wisconsin.)

George Whiting Estate Valued at $3,000,000

The residuary trust set up for the estate of the late George A. Whiting, Menasha, Wis., will be terminated July 17 and the proceeds will be turned over to Mr. Whiting's son, Frank B. Whiting of Menasha, president of the George A. Whiting Paper Company, Menasha, and the Whiting-Plover Paper Company, Stevens Point, Wis. The last inventory filed in the probate court of Winnebago county at Oshkosh, Wis., shows the estate to be valued in excess of $3,000,000.

Mr. Whiting left a settlement of approximately $91,000 and the homestead for his widow, and numerous substantial legacies, including endowments for Ripon and Lawrence Colleges. The residue was set up in the form of a ten-year trust for his son, with a provision that he was to receive an annual income of $30,000.

Trustees of the estate are E. A. Oberweiser, president of the Fox River Paper Corporation, Appleton, Wis., Attorney George Hilton of Oshkosh, Wis., and Frank B. Whiting.

Marathon Erects New Flagpole

Employees of the Marathon Paper Mills Company, Rothschild, Wis., held a noon-hour ceremony Thursday of last week to dedicate a new flagpole erected in front of the mill. The flag was raised for the first time by Boy Scouts of the Rothschild troop, and music was furnished by the WPA concert band of Wausau, Wis. E. D. Stoetzel, industrial relations manager, announced that instructions have been issued to each of the company's divisions to fly the flag daily.

Hannemann Heads Kimberly Mill Union

Otto K. Hannemann became president of the Kimberly Mill Workers' Union upon the resignation of Harold Fird, president. Mr. Hannemann was vice-president. The union is made up of workers at the Kimberly-Clark Corporation's mill at Kimberly, Wis. Mr. Fird has been given a promotion in the paper mill department and may become a permanent foreman.

Graebner-Pike Engagement

The engagement has been announced of W. H. Graebner, Menasha, Wis., and Miss Frances Pike of Detroit, Mich. Mr. Graebner is director of research for the Marathon Paper Mills Company at its Menasha Products division at Menasha. The announcement was made at a dinner given July 11 at Lawsonia hotel, Green Lake, Wis., by Mr. and Mrs. Marshall Smith of Neenah, Wis. The wedding will take place in October.

Schlosser-Lewis Nuptials

M. Austin Schlosser, technical assistant at the Institute of Paper Chemistry, Appleton, Wis., and Miss Mildred Lewis of Appleton, Wis., were married July 6 at the parsonage of St. Mary's church at Appleton. After a honeymoon trip, they will reside in Appleton.

Newsprint Link Between Canada and U.S.A.

Charles Vining, President of the Newsprint Association of Canada, Asserts Newsprint Is of More Than Economic and Commercial Significance Between the United States and Canada—Newsprint Men To Go Overseas.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., July 15, 1940—The Newsprint Association of Canada has published in folder form an article by its president, Charles Vining, in which the main argument is that newsprint forms a link between Canada and the United States that has "something more than economic and commercial significance." After pointing out the direct and indirect employment that it gives in Canada, and mentioning that it has been the largest single factor in hydro-electric developments in Quebec and Ontario, he says: "Even more important and general in its effect is the cash crop which newsprint yields each year; the dollars it brings home from other countries to provide foreign credits, purchasing power, ability to pay taxes, and now, above all these, the ability to wage war."

Importance of Canadian Newsprint to U. S.

Dealing with the importance to the newsprint industry of a continuous and reliable supply of cheap white paper, and saying that in 1940 American consumers will have to depend on Canada for probably something more than 70% of their supply he says:

"Just as the development of our newsprint industry has been based on the needs of United States publishers, so one may say with equal force that the newspaper publishing business of the United States, on its vast and continuing scale, has been possible only because Canadian forests and water-power have been able to provide a steady and unfailing supply of low-cost newsprint. At no time has this been more true than today.

"In the relationships between the United States and Canada, one thus finds in newsprint the perfect example of mutual dependability. One country cannot do without the other. Without our greatest customer, grass would soon be growing in the streets of many Canadian mill towns. And without Canadian newsprint, the presses of a thousand American newspapers would cease to roll.

Newsprint Links Canada with United States

"The newsprint link between these two countries has something more than economic and commercial significance. The Canadian newsprint industry is part and parcel of the American newspaper business. As such, it has an essential place not only in the American business structure but also in American home life and, still more important to Canadians and Americans alike, in the preservation of our similar political institutions and our common liberties of conduct, thought and speech.

"The Canadian newsprint producer and the American newspaper publisher have not only a mutual dependence but a common responsibility which recent months have made more plain. Part of this responsibility is to strive for honest understanding, confidence and fair dealing in their relations with each other."

Newsprint Men in Overseas Service

Brig.-General J. B. White, D.S.O., E.D., of Montreal, vice-president and director of the Canadian International Paper Company, has been appointed to the command of the Canadian Forestry Corps for service overseas. Harold Crabtree, president of Canada Paper Company, Montreal, and past president of the Canadian Pulp and Paper Association, has been appointed a director of "The Allied Supplies, Limited," a Government owned company set up to administer the munitions and explosives program undertaken in Canada on behalf of the British Government.

N.P.T.A. Holds Regional Meeting

A regional meeting of the National Paper Trade Association was held in Chicago at the Stevens Hotel on July 9. Some of the interesting topics discussed at this meeting were Current and Future Market Conditions, Salesmen's Compensation, and the N.P.T.A. Certification Program.

The following members were present at the meeting:

Corwine Roach — Capital City Paper Company, Springfield, Ill.; J. S. Addison—Service Paper Company, Racine, Wis.; Harry Newton — American Paper Company, Milwaukee, Wis.; H. J. Voelker—W. H. Kranz Company, Racine, Wis.; J. D. Wilson—John C. Streibich Company, Peoria, Ill.; F. A. Weber—John C. Streibich Company, Peoria, Ill.; R. O. Becker—John C. Streibich Company, Peoria, Ill.; E. A. Sullivan — Rockford Wholesale Paper Company, Rockford, Ill.; J. H. Schwarz — Schwarz Paper Company, Lincoln, Neb.; C. F. Schwarz — Schwarz Paper Company, Lincoln, Neb.; J. M. Willem—A. E. Sielaff Paper Company, Milwaukee, Wis.; E. A. Damhorst—Irwin Paper Company, Quincy, Ill.; L. J. Marshall—Marshall Paper Company, Appleton, Wis,; C. M. Yates—Dudley Paper Company, Lansing, Mich.; T. Floyd Smith, Jr. — Louisville Paper Company, Louisville, Ky.; E. P. Magel — Crescent Paper Company, Indianapolis, Ind.; I. E. Quimby—Quimby-Kain Paper Company, Grand Rapids, Mich.; V. J. Schlachter — Buckeye Paper Company, Toledo, Ohio; F. W. McCarty — Standard Paper and Woodenware Company, Kansas City, Mo.; W. P. Peterson, Peterson Paper Company, Davenport, Iowa; R. H. Ziegler — Assistant Secretary, The National Paper Trade Association.

Dee & Anderson in New Quarters

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., July 15, 1940 — On and after August 1, Dee & Anderson, Inc., the New England selling agents for the Harvey Paper Products Company, Sturgis, Mich., Paper Plate & Tray, Inc., Chicago, Ill., and the Forster Manufacturing Company, Strong, Me., will be located at 176 Federal street, with warehouse in the same building.

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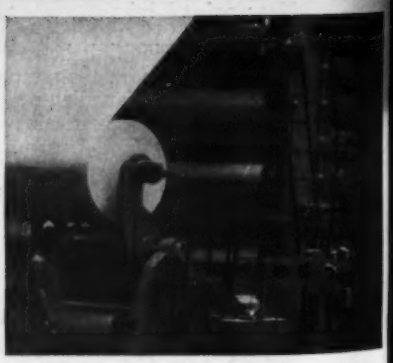

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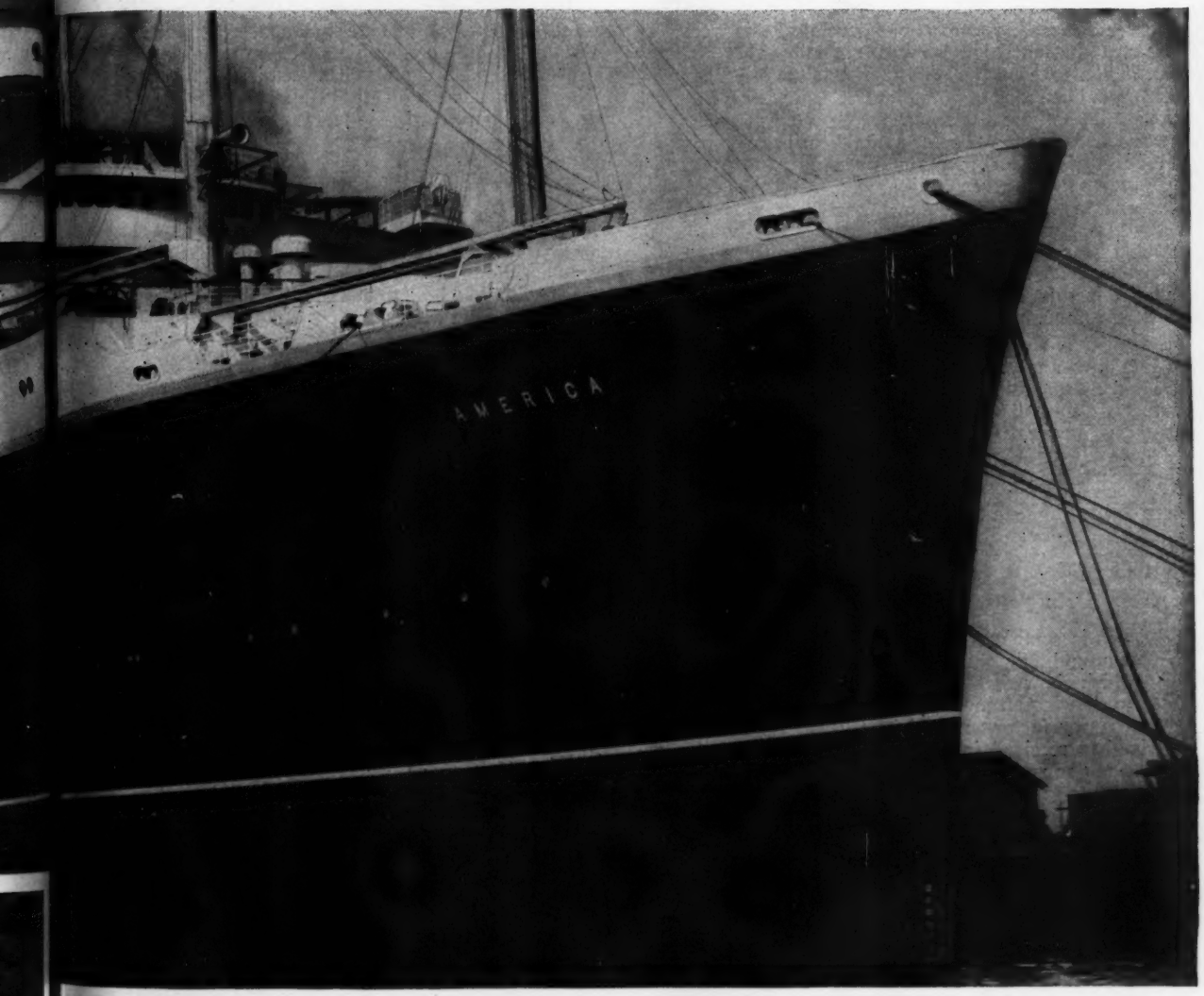

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GARGOYLE Lubricants

Chicago Reports Cautious Buying of Paper

Prices Holding Firm At New High Levels In Midwest Territory With Buying Hesitancy In Counter Trade — Waste Paper Market Strong and Prices Firm—Work Started On Corrugated Paper Plant — Other News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., July 15, 1940—The Chicago paper market situation is not entirely satisfactory to local observers, according to reactions developed this week. Prices at the new high levels are holding very well and, in the face of the pulp market situation, show little or no likelihood of going into a decline. However, demand is spotty and is reported to be void of any of the proportions of a "boom market". Mills are busy, with most of the local representatives reporting a back log of from two to seven or eight weeks. But the actual orders from the trade are slowing up to a noticeable degree. Local paper executives point to the comments of jobbers and general wholesale paper houses as an indication that general business is none too good and that the buying hesitancy is clearly reflected in the over-the-counter paper trade.

As to individual markets, kraft business seems to be retaining most of its upward velocity. Groundwoods are firm and in fair demand. Sulphites are reported as "spotty". Building papers are in good demand and there is a feeling here that improved building conditions will go a long way to strengthening this market. Bonds and ledgers ran about the same as last week with retail volume reported as disappointing though prices remained firm. Books and covers showed little disposition to change. Waste papers were firm to strong.

Chicago Gets New Industries

Chicago is confidently expecting the acquisition of new paper and allied industries according to local reports which show that manufacturers in the middlewest are showing an increasing interest in Chicago as a location for factory sites. The Clearing Industrial District has received inquiries far in excess of the past year or so and the district is proceeding with improvements on its last large tract in this well known industrial center. According to the latest data made available by the association of commerce, seven new industries have located in the Chicago area thus far this year and it has been estimated that expenditures by new and old industries totaled $29,725,000 in the first six months of 1940.

The Central Manufacturing District officials started work this week on a plant at 4500 South Kolin avenue for the Fort Wayne Corrugated Paper Company, manufacturers of fibre boxes. Plans have been completed for a one story building and basement with exterior of face brick and stone and with over-all dimensions of 220 x 330 feet. Cost is understood to be at least $150,000. The Fort Wayne Corrugated Paper Company has its main plant at Fort Wayne, Indiana, and now maintains Chicago headquarters at 2400 W. Madison street.

Sees Paper Savings in Wrapping Program

Elmer French, superintendent of the Boston Store, one of Chicago's largest retail establishments, and head of the retail committee of the National Dry Goods Association, recently reported that a saving to retailers of several million dollars a year will be effected if the Association's standard wrapping supplies program is generally adopted. A manual, recommending the purchase of certain sizes of wrapping paper, paper bags and other supplies has been issued through the New York offices of the National Retail Dry Goods Association, according to Mr. French.

Wausau Mill Begins Operations

The Wausau Paper Mills Company, through its offices at 111 West Washington Street, Chicago, announced this week that it will, within the next seven days, begin operations on its pulp mill at Brokaw, Wisconsin. The mill, which makes bleached and unbleached pulp, has been inactive since last Fall according to the local offices.

Hamilton Moves Office

W. C. Hamilton & Sons, makers of Hamilton Bond and kindred lines and with factories in the East, has recently moved its Chicago sales headquarters to suite 1832 in the building at 176 West Adams street, in the heart of Chicago's loop district.

E. A. Rohrer To Direct Swigart Sales

The Swigart Paper Company has recently announced the appointment of Eric A. Rohrer as executive vice-president and sales director of the well known Chicago jobbing firm. Mr. Rohrer is one of the most popular and well known sales executives in the Chicago area and takes his new position, effective July 1, with a well established background in the paper industry. For the past few years he has been prominently identified with Bermingham & Prosser and prior to that time spent many years with the Empire Paper Company.

Salesmen Plan Third Outing

The western division of the Salesmen's Association of the Paper Industry is all set for the third in its series of golf outings. This one, according to Patterson, Flambeau executive who has charge of the monthly events, is to be held at the Bob-O-Link Golf Club near Highland Park, Illinois. The same luncheon, golf and dinner sequence will be followed with plenty of prizes, no speech making and the proper degree of informality. The August outing will be held at the La-Grange Country Club while the wind-up event in September will synchronize with the Fall meetings of the National Paper Trade Association to be held in Chicago. Mr. Patterson is assisted in his splendid job by Ed Rolaine of Mosinee.

Rayonier Moves Offices To Chanin Bldg.

The sales offices of Rayonier Incorporated have moved to more adequate quarters on the thirtieth floor of the Chanin Building, 122 East 42nd street, New York.

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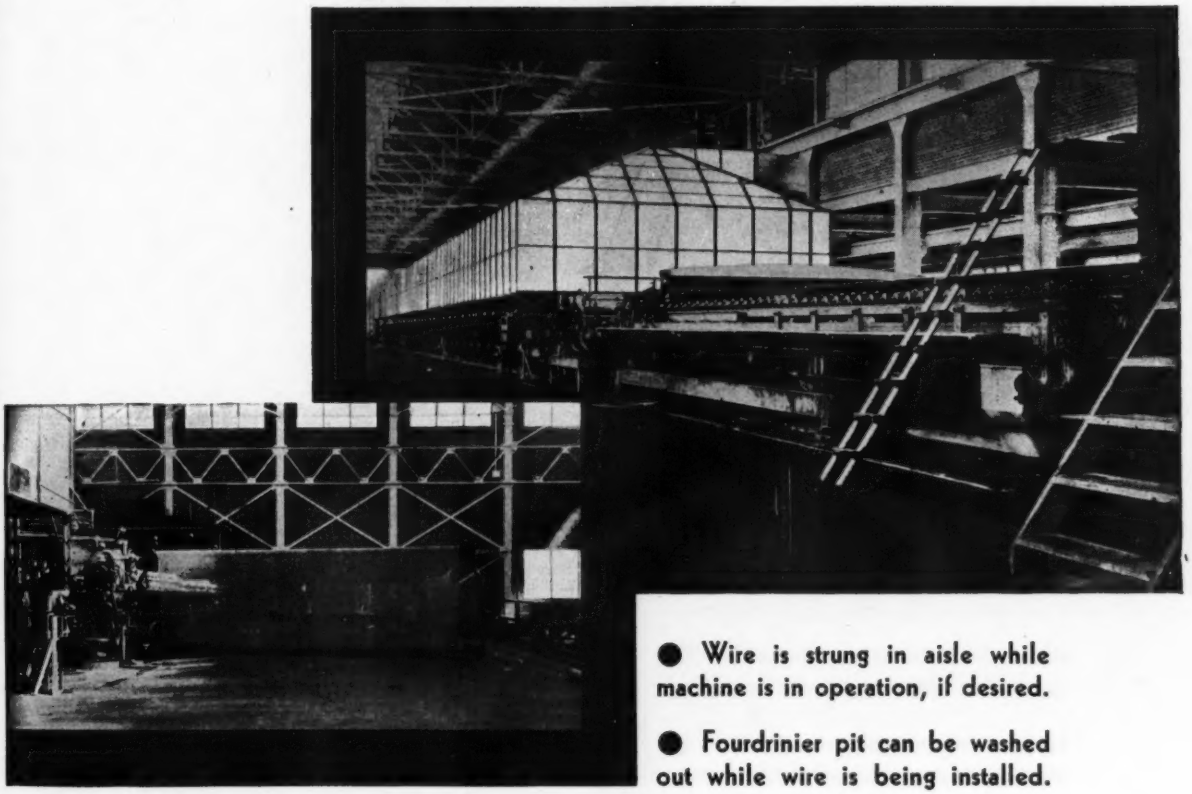

● Wire is strung in aisle while machine is in operation, if desired.

● Fourdrinier pit can be washed out while wire is being installed.

● Wire bundle is taken from shipping box and mounted directly in carriage—no chucks to apply—no further handling as bundle is unreeled as carriage moves along to form wire loop.

● All wire poles are mounted in carriage before loop is formed. Inside poles are inserted inside the wire.

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TAPPI Fall Meeting Plans

The choice of the Pacific Northwest for the 1940 Fall Meeting of The Technical Association of the Pulp and Paper Industry could not have been more timely had the Executive Committee made the decision yesterday instead of in the Fall of 1938 when they accepted the invitation of the Pacific Section to meet in Seattle August 20-23.

The eyes of the men in the paper industry have been upon the Pacific Northwest as a primary source of sulphite pulp since war began last September, for in 1939 Oregon and Washington produced nearly 40 per cent of all the sulphite pulp manufactured in the United States.

What is interesting paper mill technical men, superintendents and executives even more at this time is the realization that these two states in the Northwest corner of the nation furnished approximately 80 per cent of the sulphite pulps sold by American pulp mills in the United States in 1939.

The holding of the 1940 Fall Meeting of TAPPI in Seattle offers an unusual opportunity for the paper mill men throughout the country to visit the industry on the Pacific Coast, to see the modern mills, to see the great stands of timber which insure paper mills a permanent flow of wood pulp, to hear some excellent papers dealing with technical and operating subjects and, to have a vacation from the grind at the mill in a region always cool in the summer.

Plans Nearly Completed

Plans for the Fall Meeting in Seattle August 20, 21, 22 and 23 are almost finished, reports General Chairman G. S. Brazeau. "Reservations already in hand indicate a big crowd will be with us at the Olympic Hotel when the meeting officially opens on Tuesday morning, August 20," said Mr. Brazeau. "Men are coming from all parts of the country to take part in the instructive and interesting program the committees are preparing. Judging from a study of the reservations, we are going to have an opportunity to welcome back to the Pacific Coast a very large number of the men who attended the first TAPPI Fall Meeting held on the Pacific Coast, in Portland in 1934, and in addition a great many who have heard from those who were in Portland of the value of attending a TAPPI meeting on the West Coast."

In commenting upon the plans Mr. Brazeau remarked, "This is to be a streamlined technical meeting with the heavy emphasis on the practical benefits that will come to those who attend through their participation. Despite the stressing of the quality of the technical program there will be no lack of opportunity for diversion and relaxation.

"The technical program will cover the first two days and the second night. The meetings will be held on the University of Washington campus in an academic atmosphere so there will be no distractions.

"On the third day there will be a trip into the big timber where everyone will have an opportunity to see how the raw material for the pulp and paper industry is harvested. On the fourth day there will be opportunities for recreation and mill visits."

Technical Program

"Features of outstanding interest on the technical program", commented W. R. Barber, chairman of the Technical Program Committee, when asked concerning this fundamental part of the 1940 Fall Meeting in Seattle, "include symposia on lignin and timber resources, two subjects of great interest to the industry.

"The lignin symposium will give the lignin research men of the United States and Canada a chance to present their latest research results and to engage in mutually beneficial discussions.

The papers on lignin will include, among others, a paper by F. E. Brauns on Recent Advances in the Chemistry of Lignin, one by J. L. McCarthy on Recent Developments Relating to the Structure and Formation of Lignin, a paper by L. V. Forman on The Action of Ultra Violet Light Upon Lignin, another by A. J. Bailey on The Chemistry of Butanol Lignin, and Ultra Violet Absorption Spectra of Lignin and Its Derivatives by E. R. Gladding.

The other symposium will be devoted to forest resources of the Pacific Northwest and this is particularly timely in view of the current wood pulp situation.. The subject will be dealt with from a strictly practical viewpoint.

Participating in this symposium will be E. P. Stamm, logging superintendent of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation; Warren Tilton, forester, West Coast Lumberman's Association, and W. H. Price, forester for the Weyerhaeuser Timber Company. The discussion will be led by Professor Bror L. Grondal of the College of Forestry, University of Washington.

Group Dinners

Another feature of the technical program will be the group dinners. "These will be of interest to all technical and operating men", said Fred A. Olmsted of the Technical Program Committee, who is arranging the five dinner programs.

The subjects to be discussed informally at the dinners include acid pulping, alkaline pulping, power-steam and electric, applied hydraulics and paper machine problems. Each will be led by a man experienced in the subject."

The technical program will include a great many other subjects of industry-wide interest. Only the highlights have been touched upon here.

A Day Among the Big Trees

One Whole Day in the Forest Seeing them Log the Giant Trees. One of the highlights of the 1934 TAPPI Fall Meeting at Portland was the woods trip. We have planned another day for you this year to see logging as it may be seen nowhere else but in the forests of the Pacific Northwest. Mature giants of the forest will come crashing down before you. You will see them bucked to length and swung on trucks and rail cars for their trip to the mills. One full day in the foothills of the Cascade Mountains to get a close-up of America's big trees, the source of raw material for pulp and paper. This is a one day trip that you will not want to miss. I hope that you will be with us Thursday, August 22nd.

Want to Catch a Salmon?

If you are an early riser or if you want to catch

a big Puget Sound salmon badly enough to become an early riser on the morning of August 23rd you are invited by James Brinkley, Chairman of the Entertainment Committee, to take part in that sport which originated on Puget Sound known as the salmon derby.

"Famed Puget Sound holds a salmon for you", says Jim Brinkley, "Expert fishermen will guide you during the TAPPI Salmon Derby. The gear will be furnished, so don't bother to bring your own.

"But, if you would rather golf than fish, your committee has arranged for a tournament on one of the most beautiful courses in the land. Better bring your clubs.

Make That Special Train

"A-L-L A-BOARD for the TAPPI Special on the Northern Pacific leaving Chicago at 11 p.m. August 16th," says William A. Geiger, Chairman of the Transportation Committee. Those who heed the call of the clan of TAPPI from the East, the South and the Middle West should be in Chicago to catch the special. "If you took the special in 1934 for the meeting in Portland, you don't have to be reminded that was an event long to be remembered", says Chairman Geiger, "but those who weren't among the lucky ones six years ago ought to be let in on the good news.

"The TAPPI Special will lay over in Livingston, Montana from 8:30 A.M. until 6 P.M. on Sunday, August 18," said Mr. Geiger, "permitting those who wish to attend church services. In the afternoon the Northern Pacific is sponsoring a real western rodeo as entertainment for the guests on the special."

It is understood that the TAPPI Special is leaving Chicago on Friday, August 16th at 11 P.M. Central Standard Time, to carry all individuals supporting this movement to the Pacific Northwest for the further pursuit of the above offenses.

Aside from Serious Work

While the instructive part of the 1940 Fall Meeting of TAPPI in Seattle, August 20-23 will predominate, there will be plenty of opportunity for informal discussions and for fun.

Upon the arrival of the special train from Chicago at 8 P.M. Monday evening, August 19th, an informal reception will be held at the Olympic Hotel to provide easterners and westerners a chance to get acquainted before the work begins Tuesday morning.

Tuesday evening, August 20, there will be an informal dinner and dance at the Olympic.

On the last evening, Friday evening, August 23, a banquet and dinner dance will be held at the Olympic to do honor to the winners of the golf tournament and the salmon derby.

For the Ladies

The ladies attending the forthcoming Fall Meeting of TAPPI in Seattle, August 20-23 will find a most enjoyable program arranged for their pleasure by Ray Smythe of Portland, Chairman of the Ladies Entertainment Committee.

Mr. Smythe has let a couple of rumors get about concerning the ladies program. While the men are spending Thursday, August 22nd in the woods watching the logging operations, the ladies will be taken on a boat trip on Puget Sound through the famous San Juan Islands to Victoria, the capital city of British Columbia, and known as "a bit of old Eng-

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land". Sightseeing trips will include the places of interest in Victoria. Several hours will be spent there. Dinner will be served on the boat during the return journey to Seattle.

Seattle's gardens are known throughout the country for their beauty and Chairman Smythe has arranged for the TAPPI ladies to see the best of them. A style show and bridge luncheon are also on the program.

Besides the special features to be provided for the ladies alone there will be receptions, dinners and dances for both men and women. There is a reception on Monday evening, the informal dinner and dance Tuesday evening, the salmon derby Friday morning and the golf tournament later that same day. Then in the evening is the final dinner and dance.

Chairman Smythe requests the ladies to bring with them proper identification to avoid difficulties with the Canadian and American immigration officials when entering and leaving Victoria, B. C. The new regulations require citizenship identification such as a birth certificate, affidavit by parents as to place of birth, or a voter's registration card. One of these will satisfy the American immigration men upon returning from Canada as to the American citizenship of the individual presenting them. Naturalized American citizens must, of course, carry their naturalization papers with them on the trip into Canada.

Canadians attending the meeting in Seattle will need an entry permit and the ladies of Canadian citizenship going on the boat trip to Victoria will be required to obtain a re-entry permit in order to return to Seattle without delay. Canadian citizens residing in the United States will also have to have a re-entry permit to get back to Seattle after visiting Canada.

If the new regulations are met in the above ways there will be no delay nor inconvenience.

Superintendents Participating

The Pacific Coast Division of the American Pulp & Paper Mill Superintendents Association is actively supporting the 1940 Fall Meeting of TAPPI in Seattle.

Anton P. Siebers, Chairman of the Pacific Coast Division, is assisting in arranging the dinner meeting devoted to Paper Machine Problems, and other superintendents are taking an active part also. Most of the superintendents on the Pacific Coast are planning to attend.

Advisory Committee Working

Through the efforts of the members of the Advisory Committee to the 1940 Fall Meeting of TAPPI in Seattle, August 20-23, a large number of executives of pulp and paper mills throughout the country are planning to attend according to letters already received.

The Advisory Committee includes: J. D. Zellerbach, president of the Crown Zellerbach Corporation and executive vice-president of Rayonier Incorporated and Fibreboard Products, Incorporated; Ossian Anderson, president of Puget Sound Pulp & Timber Company and executive-vice-president of the St. Regis Kraft Company; Robert B. Wolf, manager, Pulp Division, Weyerhaeuser Timber Company; U. M. Dickey, president of the Soundview Pulp Company; Nils G. Teren, vice-president and manager, Columbia River Paper Mills and of the Oregon Pulp and Paper Company; Max Oberdorfer, president of the St. Helens Pulp and Paper Company.

R. S. Wertheimer, secretary-treasurer and resident manager of the Longview Fibre Company; Lawrence Killam, president of the British Columbia Pulp & Paper Company; Chester A. Buckland, general manager of the Inland Empire Paper Company; Wm. J. Pilz, vice-president and manager of the Everett Pulp & Paper Company; Arthur Zimmerman, manager of the Pacific Straw Paper & Board Company; J. H. Smith, vice-president of the Hawley Pulp & Paper Company; K. O. Fosse, president of the Coos Bay Pulp Corporation; and J. C. Compton, president of the Spaulding Pulp & Paper Company.

Make Your Reservations Immediately

Now is the time to make your reservations for the big 1940 Fall Meeting of TAPPI in Seattle, August 20-23.

If you can possibly make the TAPPI Special leaving Chicago Friday evening, August 16th at 11 P.M. Central Standard Time, write for reservations to William A. Geiger, Chairman Transportation Committee, 400 West Madison Street, Chicago.

For hotel reservations write G. S. Brazeau, General Chairman, Olympic Hotel, Seattle, Wash.

Government Paper Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 17, 1940—Perkins-Goodwin Company has been awarded the contract for furnishing the Government Printing Office with 85,400 pounds (700,000 sheets) of 28 x 34 white sulphite writing paper at 5.34 cents. Old Dominion Paper Company will furnish 13,200 pounds (100,000 sheets) of 50 per cent rag, 26 x 34 white bond paper at 12.239 cents. Bids for both of these items were received on June 24. Other paper awards announced include the following:

Old Dominion Paper Company will furnish 40,000 pounds of newsprint paper in 19-inch rolls at 3.839 cents, bids for which were received on June 21.

Russell Products Company will furnish 400 pounds of facing stero tissue paper in 24-inch rolls, bids for which were received on June 19.

Barton, Duer & Koch Paper Company will furnish 17,550 pounds of 100 per cent rag, 24 x 38 white ledger paper; 4,000 pounds same, 21 x 32½; and 5,000 pounds same 24 x 38, all at 18.43 cents. Mudge Paper Company will furnish 2,110 sheets of 20 x 25 green gummed paper at $9.70 per M sheets. Bids for these items were received on June 17.

R. P. Andrews Paper Company will furnish 780 pounds (3,000 sheets) of 26 x 40, deckle edge, buff antique cover paper at 17.5 cents and George LaMonte & Son will furnish 13,475 pounds (61,000 sheets) of 22 x 28 special W.P.A. safety paper at 11.75 cents. Bids for these items were received on June 14.

Middlesex Products Corporation will furnish 60,000 sheets of 24 x 36 white cloth lined paper at $81 per M sheets, bids for which were received on June 12.

H. W. Lockhart Leaves Hospital

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., July 15, 1940—Hubert W. Lockhart, head of the Von Olker-Snell Paper Company, has returned to his home in Belmont, Mass., from the Cambridge Hospital, where he has been, due to a broken vertebra, sustained by a fall while riding horseback.

OPACITY • WHITENESS • BRIGHTNESS

Your Supply of TITANOX *is "Just Around the Corner"*

Of this you may be certain—that when you call for TITANOX it will be available to you and delivered speedily. Wherever your plant may be located, at least one of our warehousing points is so close by as to insure delivery of sufficient pigment to permit you to carry on until normal shipment can be made.

To assure such cooperation TITANOX has established 26 warehouses at strategic points from which any of the pigments may be had on short notice. And to assure an adequate supply of TITANOX pigments, production capacity of the Sayreville, N. J. and St. Louis, Mo. plants has been increased substantially during the past year, with additional increases now being made.

Our Service Department always is pleased to assist you in applying TITANOX pigments to your paper products.

TITANIUM PIGMENT CORPORATION

SOLE SALES AGENT

111 Broadway, New York, N. Y.
104 South Michigan Ave., Chicago, Illinois
National Lead Co. (Pacific Coast Branch)
2240 24th Street, San Francisco, Calif.

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TRADE MARK

Converted Paper Products Committee Appointed for Minimum Wage

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 17, 1940—Appointment of committee to investigate the industry and recommend a minimum wage for the manufacturing of converted paper products was announced this week by Colonel Philip B. Fleming, Administrator of the Wage and Hour Division, Department of Labor. A committee on the manufacture of pulp and primary paper was appointed in February, and its recommendation of 40 cents an hour for that part of the paper industry is awaiting administrative action.

The converted paper products committee is authorized by the Fair Labor Standards Act to recommend minimum wage rates between 30 and 40 cents an hour. The committee is expected to convene in September in Washington at the call of the chairman, Wayne Lyman Morse of the University of Oregon. In advance of this meeting, the committee will consider a study of wages paid in the industry, prepared by statisticians of the Wage and Hour Division.

The industry is defined for the purposes of establishing a minimum wage as:

"The manufacture of all products which have as a basic component pulp, paper or board (as those terms are used in Administrative Order No. 41 defining the Pulp and Primary Paper Industry) and the manufacture of all like products in which synthetic materials, such as cellophane, pliofilm or synthetic resin, used in sheet form, is a basic component.

"Provided, however, that the manufacture of the following shall not be included:

"(a) Any product the manufacture of which is covered by a wage order of the administrator relating to the textile, apparel, hat, millinery, or shoe industry or by an order of the administrator appointing an industry committee for and defining the pulp and primary paper, carpet and rug, or luggage and leather goods industry.

"(b) Any product, such as rayon, cellophane, etc., made from such pulp by a process which involves the destruction of the original fibrous structure of such pulp.

"(c) Wall paper, roofing paper, insulation board, shingles or lamp shades.

"(d) Newspapers, magazines, books, blueprints, photographs and other products in which graphic art is the exclusive medium through which the products function, provided, however, that the production of printed forms, stationery, blank books, and tablets, other than the printing thereof in a job printing establishment, and the production of other products in the use of which graphic art is applied by the ultimate consumer of the products, shall be included within the converted paper products industry as herein defined."

The definition of the converted paper products industry covers all occupations in the industry which are necessary to the production of the products specified in the definition, including clerical, maintenance, shipping and selling occupations.

The Wage and Hour Division has been studying the paper industry for more than a year with a view to drawing appropriate definitions and appointing committees. The industry, as defined, is carried on in some 2,300 establishments; its annual product is valued at about $1,000,000,000; it employs some 200,000 wage earners of whom about 30 per cent are women and girls. About 30,000 of the employees are now earning less than 40 cents an hour, the highest wage which the committee can recommend.

The members of the committee are as follows:

For the Public

Wayne Lyman Morse, dean of the law school, University of Oregon, Eugene, Ore. (Chairman).

William E. Simkin, Philadelphia.

Dr. John A. Lapp, Chicago.

Thomas L. Norton, professor of economics, University of Buffalo, Buffalo, N. Y.

Edgar M. Hoover, Jr., assistant professor of economics, University of Michigan, Ann Arbor, Mich.

Colonel William John Wilgus, engineer, Ascutney, Vt.

Tipton R. Snavely, professor of economics, University of Virginia, Charlottesville, Va.

Joseph M. Klamen, associate professor of economics, Washington University, St. Louis.

William Haber, professor of economics, University of Michigan, Ann Arbor, Mich.

For the Employers

H. M. Treen, Fort Wayne Corrugated Paper Company, Fort Wayne, Ind.

A. R. Leiserson, American Paper Company, Richmond, Va.

Norman Greenway, Robert Gair Company, New York.

Allen K. Schleicher, F. J. Schleicher Paper Box Company, St. Louis.

Vasco Nunez, Nashua Gummed and Coated Paper Company, Nashua, N. H.

J. L. Coker, Sonoco Products Company, Hartsville, S. C.

F. R. White, Universal Paper Bag Company, New Hope, Pa.

Ralph Hayward, Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich.

E. V. Johnson, U. S. Envelope Company, Springfield, Mass.

For the Employees

Boris Shishkin, American Federation of Labor, Washington, D. C.

John Sherman, vice-president, International Brotherhood of Pulp, Sulphite and Paper Mill Workers (A. F. of L.), Tacoma, Wash.

Earl Taylor, I.B.P.S.P.M.W. (A. F. of L.), Toledo, Ohio.

Homer Humble, I.B.P.S.P.M.W. (A. F. of L.), Mobile, Ala.

Harriet Wray, I.B.P.S.P.M.W. (A. F. of L.), New York.

C. V. Ernest, International Printing Pressmen and Assistants' Union of North America (A. F. of L.), Baltimore, Md.

(Continued on page 44)

FOR many years Du Pont Auramine has enjoyed wide use in dyeing all grades of paper. It is principally recommended for bright canary shades on wrapping, poster, tissue and other cheap papers where fastness is not essential. On higher grade papers it is largely used for topping acid and direct colors to obtain brightness.

- **Du Pont Auramine is suitable for calender coloring, dipping and coating.**
- **It possesses very good solubility, shows no graniting, bleeds only slightly, has good affinity for cellulose.**
- **Its working properties on all types of stock are good.**
- **Optimum results are obtained in a pH range of 4.5 to 6.0.**

This product is manufactured in three concentrations. Sixty parts of Du Pont Auramine Concentrated or 80 parts of Du Pont Auramine O Extra are equal to 100 parts of Du Pont Auramine O.

Product uniformity can be relied upon—available because of rigid adherence to high standards of quality and careful control.

DU PONT DYESTUFFS
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E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Dept., Dyestuffs Div., Wilmington, Del.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending July 17, 1940

	High	Low	Last
A. P. W.	....	....	....
Armstrong Cork Co.	29½	28¾	29½
Celotex Corp.	6¾	6½	6½
Celotex Corp., pf.	53	53	53
Certain-Teed Products Corp.	4⅜	4⅛	4¼
Certain-Teed Products Corp., pf.	23	20½	21¾
Champion Paper & Fibre Co.	22	21½	22
Champion Paper & Fibre Co., pf.	100	100	100
Congoleum-Nairn Co.	17⅜	15½	17
Container Corp. of America	13⅜	12¾	13¼
Continental-Diamond Fibre Co.	6⅛	6	6⅛
Crown-Zellerbach Co.	14½	14	14
Crown-Zellerbach Co., pf.	90	84	90
Flintkote Co.	13½	12¾	13¼
Robert Gair	2⅜	2¾	2¾
Robert Gair, pf.	12⅞	12¾	12⅞
International Paper & Power	13½	12⅝	12⅝
International Paper & Power, pf.	49¼	47½	49
Johns-Manville Corp.	57	55½	56½
Johns-Manville Corp., pf.	....	....	....
Kimberly Clark Corp.	34	34	34
MacAndrews & Forbes	27¾	27⅜	27¾
MacAndrews & Forbes, pf.	27⅜	27⅜	27⅜
Masonite Corp.	26	25	25¾
Mead Corp.	8¾	8½	8¾
Mead Corp., pf.	75	75	75
Paraffine Companies, Inc.	31½	31½	31½
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	16⅛	15¾	16
Rayonier, Inc., pf.	29¾	25⅝	29¾
Ruberoid Co.	15⅞	15½	15⅞
Scott Paper Co.	40	39¾	39¾
Scott Paper Co., pf.	103½	103¼	103¼
Sutherland Paper Co.	23	23	23
Union Bag & Paper Corp.	11⅜	10¾	11
United Paperboard Co.	....	....	....
U. S. Gypsum Co.	60	56½	60
U. S. Gypsum Co., pf.	....	....	....

New York Curb Exchange

High, Low and Last for Week Ending July 17, 1940

	High	Low	Last
American Box Board Co.	4⅜	4⅜	4⅜
Brown Co., pf.	18½	16½	18½
Great Northern Paper	....	....	....
National Container Corp.	10½	10½	10½
St. Regis Paper Co.	2¾	2⅝	2⅝
St. Regis Paper Co., pf.	....	....	....
Taggart Corp.	3	3	3

I. P. Reduced Debt $4,700,000

International Paper paid off $2,800,000 of bank debt in June of this year, R. J. Cullen, president of the company, announced last week, adding that the total debt retired by International Paper and its subsidiaries to date this year exceeds $4,700,000. Mr. Cullen pointed out that this debt reduction is in line with the policy which the management has followed in recent years and which has resulted in the company's present strong credit position.

In the five years ended December 31, 1939, capital expenditures on plants and properties were made by International Paper and subsidiaries totaling $43,683,465, this figure excluding the company's former Newfoundland subsidiary, control of which was sold as of December 31, 1937.

Over 79 per cent of the company's capital expenditures during this period was spent upon construction and improvement of properties in the United States, $22,482,164 being spent on the company's Southern Kraft properties alone. Mr. Cullen asserted that International Paper has thus maintained its position as the largest unit in kraft paper and board industry in the United States. Kraft production has risen from approximately 26 per cent of the company's total tonnage production in 1934, excluding the Newfoundland subsidiary, to 48 per cent in 1939.

As a result of the expected merger of Southern Kraft Corporation with International Paper prior to or concurrently with the latter company's forthcoming $32,000,000 of first mortgage bond refunding, International Paper will own directly about 93 per cent of all the properties which it controls in the United States, Cullen said.

Pointing out that total American assets of International Paper as constituted upon consummation of the proposed Southern Kraft merger, exceeded $112,000,000 as of December 31, 1939, Mr. Cullen said that most of the funds for the $43,683,465 expended on the properties in the past five years represented the reinvestment of earnings and accrued depreciation. Two of the company's new kraft mills were financed originally through its banks by short term construction loans, but the additional debt so incurred has been more than offset by debt retirement through sinking funds, payment of serial maturities, and other repayments.

Mead Corp. Profits Up

The Mead Corporation and subsidiaries report for 24 weeks ended June 15, 1940, net profit of $681,532 after charges and federal income taxes, equal after preferred dividend requirements, to 76 cents a share on 619,374 no-par shares of common stock.

This compares with net profit of $157,219, equal to $1.94 a share on combined 31,935 shares of $6 preferred, Series A and 49,200 shares of $5.50 Series B preferred stock for the 24 weeks ended June 17, 1939.

For the 12 weeks ended June 15, last, net profit was $324,020 equal to 36 cents a share on common, comparing with net profit of $80,109, equal to 99 cents a share on combined preferred stocks for the 12 weeks ended June 17, 1939, and with net profit of $357,512, equal to 40 cents a common share for the 12 weeks ended March 23, 1940.

Net sales for the 24 weeks ended June 15, 1940, totaled $11,307,520, compared with $9,387,127 for the like period in 1939.

Rayonier Profits Rise

Rayonier, Inc., established new high records in production and tonnage sales during its fiscal year ended on April 30, according to the annual report issued for publication today by Edward M. Mills, president.

The consolidated net profit of $2,389,488 for the year equaled $1.18 each on the 963,871 shares of $1 par common stock outstanding, after allowing for regular preferred dividend requirements. The earnings represent the second largest in the history of the company and its predecessors combined. They compare with a net profit of $1,176,646 or $1.88 a share on the $2 cumulative preferred stock, reported for the preceding fiscal year.

For the final quarter of the company's fiscal year, the indicated net profit was $964,295 or 68 cents a

share on the common stock. This is in contrast to an indicated net loss of $244,785 sustained in the corresponding period of the previous year.

During the fiscal year, the company's production of all types of pulp and of fine papers totaled 264,-147 tons, against 127,819 tons in the preceding year ended on April 30, 1939, an increase of 106.6 per cent. Production of dissolving pulps amounted to 195,834 tons against 83,828 tons the year before, a gain of 133.6 per cent.

Current assets on April 30, last, amounted to $7,-067,022 and current liabilities to $2,744,604, compared with $6,026,406 and $1,849,160, respectively, on April 30, 1939.

New Orders Up 10 Per Cent

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 17, 1940—Monthly Survey of Industry, compiled by the Commerce Department, for May shows manufacturers' new orders up 10 per cent from April and shipments 2½ per cent higher than April. Inventories at the end of May were unchanged from the April figure.

Paper and allied products inventories taking December 1938 at 100, were 105.2 in May compared with 106.6 in April and 94.5 in May of last year.

Value of shipments in paper and allied products industries taking January 1939 at 100, was 137.3 in May compared with 124.4 in April and 103.3 in May of last year.

File Suit Against South Bend Mills

[FROM OUR REGULAR CORRESPONDENT]

SOUTH BEND, Ind., July 15, 1940—A suit asking $11,000 from the South Bend Paper Mills Corporation for fourteen employees who charge violation of the federal fair labor standards act of 1938 has been filed in circuit court here. The complaint alleges that workers were denied overtime pay during the year ending October 24, 1939, and from that date until March 31, this year.

Southern Advance Profits Up

The Southern Advance Bag and Paper Company reports gross sales for the five months to May 31, less returns and allowances, of $2,625,378, compared with $1,983,754 last year; net income available for fixed charges, $376,957. After provision for Federal income taxes and preferred dividend requirements, there was a balance of $179,366, or $1.07 each on 166,650 shares of common stock.

Soundview Nets $1,161,223

The Soundview Pulp Company and subsidiaries for the six months to June 30, reports a net income of $1,161,223, equivalent to $2.24 a share on outstanding stock, compared with $132,382, or 14 cents a share, last year. June quarter: Net income, $624,-187, equivalent to $1.21 a share, compared with $54,385, or 5 cents a share, last year.

Tomahawk Earns $90,135

The Tomahawk Kraft Paper Company reports for the year to May 31 a net income of $90,135, contrasted to a net loss of $96,589 for year to May 31, 1939.

"When equipment needs replacing, I know by experience that ARMCO Stainless Steels can help you make money and save money. One by one, I've learned 12 reasons for this. And here they are:"

1. Longer equipment life because of increased corrosion and abrasion resistance.

2. Less slime growth and accumulation.

3. Less chance of lost time on production equipment due to failure of material.

4. Less time, lower labor costs, when equipment must be dismantled and relocated or rebuilt.

5. Less paper stock lost to the sewer in clean-up.

6. Helps maintain production schedules by preventing frequent shut-downs for clean-ups.

7. No boil-outs either for color changes or to remove chemical solutions.

8. Cuts cost of chemical control in combatting slime.

9. Less contamination of paper by rust and dirt.

10. Less paper breakage and attendant lost time and production.

11. Reduces loss of paper brightness caused by dissolved iron in the stock solution.

12. Lower chemical costs to restore paper brightness.

Let ARMCO Stainless Steels help *you* produce cleaner, more salable paper at lower over-all cost. Just say the word and we shall give you the names of reliable equipment manufacturers. The American Rolling Mill Company, 2141 Curtis Street, Middletown, Ohio.

ARMCO

ARMCO STAINLESS STEELS

PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

Henry J. Berger
EDITOR

Vol. 111 July 18, 1940 No. 3

COMING EVENTS IN PAPER INDUSTRY

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Fall Meeting, Olympic Hotel, Seattle, Wash., August 20-23.

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

NATIONAL SAFETY COUNCIL, PAPER AND PULP SECTION, Annual Meeting, Stevens Hotel, Chicago, Ill. October 7-11.

NATIONAL PAPER TRADE ASSOCIATION, annual Fall Meeting, Stevens Hotel, Chicago, Ill. September 23-25.

OPERATIONS AND PROFITS

National defense plans are certain to exert a great and stimulating effect upon business and these plans now include expenditures of more than $14,000,000,000, a navy increased to twice its present size, equipment for an army of one million men and an air force of at least 15,000 first-line planes. This great investment of public funds for the attainment of national security also includes the prospect of compulsory military training and conscription of man power. To accomplish this large-scale and costly armament project, many changes must inevitably occur in the status of American social and business life. The effect, some economists point out, will be certain to increase the national income through increased employment and substantial increases in production and distribution of durable and non-durable goods during the balance of this year and during the following year.

Strict controls in industry necessary to national defense have been provided by Congress and the Administration now has full authority to force, if necessary, complete participation of industry in the new limited profits armament program. This means that the three essential features of the absolute control of business whenever the necessity should arise is now in the hands of the President. The Government, therefore, has full authority to commandeer privately owned industrial and utility plants, and all transportation and storage facilities. The Government is also fully authorized to build and equip new plants, which may be operated by the Government or leased to private manufacturers. Furthermore, the Government has full authority to prohibit or ration the export of any raw material required for national defense, and is empowered to finance the expansion of privately owned plants through loans or capital investments.

With this power to utilize all the resources of the nation, the Government has been given by Congress absolute control over defense industries, equal to the authority delegated to the President under the National Defense Act of 1916. In other words, it is now possible to mobilize the country on a scale similar to that at present in force in Great Britain, Germany and other belligerent countries.

This grant of authority was hurriedly passed by Congress and it is sufficiently comprehensive to nationalize self defense. The power to commandeer plants is, of course, provided for use only in the event that businessmen should refuse to cooperate fully in preparations for defense of the nation under the strict limitations on profits imposed by Congress. Two bills, the Army, HR 9859, and Navy, HR 9822, place strict limitations on the profits that can be made on defense orders. For example, on contracts let by direct negotiations between a firm and the Government, the maximum profit permitted is 7 per cent of the estimated cost of the order. The profit in aircraft, Army and Navy contracts by competitive bidding is limited to 8 per cent of cost, compared with 10 per cent on naval ships and 12 per cent on aircraft formerly in effect. The former system of computing profit on the basis of final cost has been superseded by a new system of "cost plus fixed fee". This method provides the manufacturer's profit shall be fixed at the time the contract is made, based on a percentage of the estimated cost. If cost is above estimate, there is no increase in the profit to the manufacturer. If actual cost is less than original estimates, any profit above the limit is recoverable by the Treasury Department. In such a case, an extra profit of less than 1 per cent will be allowed the manufacturer as a form of bonus for reducing production costs.

To eliminate the large profits formerly associated with large armament orders, Congress has announced that an excess profits tax will be enacted next fall or winter applicable to 1940 incomes of corporations. In addition to this strict control on production, profit and exports, the mobilization plan for national defense requires strict observance of employment standards as set forth by the Public Contracts Act, otherwise known as the Walsh-Healey Act, which permits the Secretary of Labor to fix minimum wages and enforce payment of time and one-half for all time worked by employees in excess of 40 hours per week. Another defense bill authorizes the Reconstruction Finance Corporation to form new corporations to construct plants for government or private operations, and to purchase capital stock of private defense industries to provide capital. To allay any fears that the

Administration contemplates setting up competition with privately owned plants, Federal Loan Administrator Jesse Jones has announced that the Administration has no intention of adopting a broad program of government-operated defense plants. At this time about $1,000,000,000 is estimated required for plant expansion, compared with expenditures of $2,000,000,000 during the world conflict.

It is taken for granted by most men, that the expenditure of so large an amount for defense as has been already authorized and appropriated by Congress, must be a heavy burden on all. But not all the taxes now in force have any appreciably harmful effects on business activity, as the proposed excess profits tax is certain to have, as past experience has demonstrated. It has been pointed out by a well known tax authority that it appears that a sum of about $6,000,000,000 is sought for the Treasury for national defense and that about $3,000,000,000 is to be raised during the current fiscal year by additional taxes, of which over $2,200,000,000 might be sought from the excess-profits tax. In the opinion of this authority, so drastic a tax program would certainly be likely to have a deterring effect upon further business expansion in other than strictly defense activities. At this date it is thought likely that the new tax will be a combination of the profits tax in force during the world conflict and the post-war excess profits tax. No statement has yet been made at Washington and no indication of the kind of excess-profits tax to be recommended to Congress is known, though it is the opinion of those well informed on tax matters that no deterrent tax measures will be enacted.

News Print Production Increases

Production of newsprint in Canada during June 1940 amounted to 315,343 tons and shipments to 338,446 tons according to the News Print Service Bureau. Production in the United States was 84,762 tons and shipments 85,194 tons, making a total United States and Canadian newsprint production of 400,105 tons and shipments of 423,640 tons. During June, 30,262 tons of newsprint were made in Newfoundland, so that the total North American production for the month amounted to 430,367 tons. Total production in June 1939 was 344,044 tons.

The Canadian mills produced 300,923 tons more in the first six months of 1940 than in the first six months of 1939, which was an increase of twenty-two and four tenths per cent. The output in the United States was 40,082 tons or eight and five tenths per cent more than in the first six months of 1939, in Newfoundland production was 31,920 tons or twenty-three and one tenth per cent more, making a total increase of 372,925 tons, or nineteen and one tenth per cent more than in the first six months of 1939.

Stocks of newsprint paper at the end of June were 180, 569 tons at Canadian mills and 17,543 tons at United States mills, making a combined total of 198,112 tons compared with 221,647 tons on May 31, 1940, and 213,592 tons at the end of June 1939.

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association.

COMPARATIVE MONTHLY SUMMARIES[1]

Months	1940	1939	1938	1937	1936	1935	1934
January	90.2%	77.5%	63.9%	90.3%	76.1%	65.8%	.....
February	86.2%	81.7%	68.7%	90.1%	77.9%	70.0%	.....
March	83.9%	84.0%	69.6%	90.3%	76.0%	70.5%	.....
April	86.3%	82.9%	68.3%	92.1%	82.3%	70.0%	.....
May	91.7%	80.2%	69.0%	90.6%	81.6%	69.4%	.....
June	94.8%	79.7%	66.0%	87.3%	80.7%	72.3%	.....
July	.....	75.2%	72.0%	81.8%	77.3%	64.9%	.....
August	.....	82.9%	77.2%	82.9%	81.5%	70.9%	.....
September	.....	88.7%	76.3%	78.6%	80.5%	71.9%	58.2%
October	.....	96.6%	82.5%	73.5%	87.6%	75.6%	64.7%
November	.....	97.2%	79.6%	61.9%	88.0%	75.3%	61.7%
December	.....	91.1%	74.4%	54.5%	85.9%	71.2%	59.6%
Year Average	.....	84.9%	72.3%	80.6%	81.3%	70.5%	.....
First 27 weeks	88.3%	80.2%	67.3%	89.2%	78.6%	68.8%	.....

COMPARATIVE WEEKLY SUMMARIES[1]

CURRENT WEEKS, 1940		CORRESPONDING WEEKS, 1939	
June 1	90.0%	June 3	74.2%
June 8	93.6%	June 10	79.3%
June 15	94.7%	June 17	79.0%
June 22	96.0%	June 24	79.2%
June 29	94.9%	July 1	81.2%
*July 6 (Holiday Week)	69.6%	July 8	56.3%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting—Current Weeks					
Ratio Limits	June 1, 1940	June 8, 1940	June 15, 1940	June 22, 1940	June 29, 1940	July 6, 1940
0% to 50%	58	36	38	37	27	89
51% to 100%	234	251	246	248	249	158
Total Mills Reporting	292	287	284	285	276	247

PAPERBOARD OPERATING RATIOS

Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1936	62%	67%	67%	70%	69%	70%	69%
1937	80%	86%	86%	88%	85%	77%	66%
1938	54%	60%	61%	57%	58%	56%	57%
1939	60%	67%	71%	69%	64%	67%	63%
1940	71%	70%	69%	70%	76%	79%	....

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1936	75%	78%	82%	80%	74%	72%
1937	74%	69%	65%	55%	45%	73%
1938	66%	66%	70%	65%	59%	61%
1939	72%	74%	84%	81%	71%	70%
1940	....	....	....	....	....	....

Week end. June 1, 1940—75%
Week end. June 8, 1940—77%
Week end. June 15, 1940—79%
Week end. June 22, 1940—79%
Week end. June 29, 1940—80%
Week end. July 6, 1940—60%

[1] Production-capacity ratios are based upon six-day capacity ratings which are adjusted periodically to correspond with the ratings reported by individual companies. Ratios are subject to revision until all reports are received.

* Preliminary figure.

Moyer & Pratt Resume Operations

[FROM OUR REGULAR CORRESPONDENT]

LYONS FALLS, N. Y., July 15, 1940—The pulp mill of the Moyer & Pratt Inc. resumed operations last week when about fifteen employees were recalled. The entire mill has been closed since early in February when a strike followed labor disputes. All former employees are to be given the opportunity to return to work, it was stated. No discussion of wages was made and it is anticipated that the same scale will prevail as before the walkout. The closing of the mill became necessary when the owner failed to bargain with the local union, an affiliate of the American Federation of Labor, which was organized last winter.

The opening of the pulp mill will be followed by a resumption of operations by the small and large paper machines within the next ten days.

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Edited by Ronald G. Macdonald, Secretary

The Effect of Clay Characteristics on the Calendering of Clay-Filled Handsheets*

By B. W. Rowland[1] and Henry J. Allison, Jr.[2]

Abstract

As a continuation study of the colloidal characteristics of clay with reference to papermaking, this paper refers to the correlation between the hydration properties of clay and the finishing characteristics of the sheet. In order to show a wide range of variations for the purposes of theoretical interpretation, a study has been made of a series of kaolins ranging from bentonite, representing the extreme in hydration, through the papermaking types of clays and concluding with burnt clay, which represents the other extreme in hydration. The various minerals were used as fillers, and the measurements were made on the optical properties of the sheets after laboratory finishing. These optical properties included brightness, opacity, and gloss, and in addition, measurements were made of oil receptivity with reference to the printability of the sheets. It was found that the clay filler has considerable effect upon the changes in the optical properties and on the oil absorption of the sheet upon calendering under certain conditions. As might be anticipated, the changes due to the characteristics of such a wide assortment of clays are very considerable. The changes in opacity and brightness are of such a nature as to indicate that the two properties are controlled by the same fundamental factors. This work necessitated the study of the effect of moisture content on the properties considered, and perhaps the most striking conclusion is that the presence of a greater amount of moisture in the sheet causes a greater loss of brightness and opacity while the sheet becomes glossier and less oil absorptive, these effects being for the most part small for the less hydrous clays and large for the more hydrous ones. Obviously the source of the clay and the degree of fractionation will play an important part in determining these characteristics of the clay when used as a filler.

Much of the work which has been done with clays used for both filling and coating operations has indicated that there is considerable difference in the results obtained by using different clays under otherwise identical conditions. This was especially noted in surface and printing properties of sheets made with dehydrated clay. These observations led to the idea that some factor other than particle size, such as the degree of hydration or the type of clay mineral content, might account for the variations noted.

Object of the Work

The object of this work, therefore, was to investigate the effect on the changes in the optical properties and oil absorption of a clay-filled sheet after calendering as the result of the use of different clays and differences in moisture content of the sheets. The data herein presented were obtained with laboratory procedures which were adjusted to correspond with mill conditions as closely as possible.

The Physical Structure of Clays

In a very recent publication, Reed *(1)* discusses the plate-like crystalline structure of clays previously mentioned by Marshall *(2, 3)*, Lewis, Squires, and Thompson *(4)*, and others *(5, 6)*. Reed pictures clay particles as a pack of cards, with the individual layers held together either by mechanical interference (provided the dimensions are as Lewis, Squires, and Thompson *(4)* have described—the length and width very large as compared with the thickness) or by forces dependent upon the repulsion-attraction theory (assuming the existence of far-reaching forces of attraction and repulsion).

This theory accounts for the high swelling of bentonite through the penetration of the water molecules into the crystallites and the forcing apart of the plate-like units. The high degree of hydration of certain of the clays probably makes it possible for comparatively slight mechanical forces to break the single crystals by the gliding of one plane over another. For this reason, the clays exhibiting the expanding lattice phenomenon should show such slippage readily, whereas those clays which are composed largely of the true kaolins should show much less of this type of slippage.

Typical Formulas

The heating of a clay to a very high temperature (above 600 deg. C.) is known to dehydrate the clay

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irreversibly. Vasel *(7)* gives these formulas as typical of the dehydration reaction at high temperatures:

$$\text{Clay} \longrightarrow Al_2O_3 \cdot 2SiO_2 \text{ (metakaolin)}$$
$$\text{Kaolin} \longrightarrow 3Al_2O_3 \cdot 2SiO_2 \text{ (mullite).}$$

The effect of this heating is apparently to remove completely the expanding lattice properties from the clay minerals of the pyrophyllite type (probably by entirely collapsing this structure) and to remove all water and to rearrange all secondary bonds in the kaolinite type clay minerals. The effect on the plane-slippage properties mentioned above is to so bind the clay crystal particles that little or no slippage would occur, even at relatively high pressures.

The individual clay layers causing these slippage planes are all quite thin and smooth. The spreading out of these thin, smooth planes in a sheet, such as might result from the application of rather high-pressure calendering, would therefore cause considerable changes in the optical and surface properties of the paper. As Marshall *(8)* has shown, the greater the degree of hydration, the less is the force required to cause this slippage of planes. Hence, it quite logically follows that there would be no slippage of the planes in the dehydrated clays. This may be proved through simple microscopic observation.

Historical Review

A search of the literature has yielded only one comprehensive article concerning the effects of fillers on the drying and finishing of papers. This work, by Brecht and Pfretzschner *(9)*, is a complete investigation on the loading of paper. In the work, however, only two clays are included: a china clay and a kaolin; no information is given about either one. In their work, one section is devoted to a study of the effect of fillers on the smoothness of calendered sheets. The methods used to interpret their results are not clear, but they do find differences in the results when using different fillers. However, they seem to find no differences between the clay and the kaolin. The experimental methods are not given.

Except for the above information, practically nothing is mentioned in the literature relative to these factors. Clark *(10)* has shown graphically that the clay content has a noticeable effect on the moisture in the sheet when it is in equilibrium with any atmospheric humidity. Strachan *(11)* pointed out that, since the particles of the loading material fill the voids between the fibers and since clays are relatively plastic, a clay-filled sheet should become much smoother upon calendering than an unfilled sheet. In addition, a more moist sheet should become smoother than a drier one, because the fibers in the more moist sheet are plastic and, hence, will tend to respond more readily to the smoothing action of the calender roll.

Little more has been published concerning the effects of clays on the changes in optical properties of paper upon calendering. The most important effect in this respect is that the paper becomes dull and gray when calendered. This is known as "blackening." It is common knowledge *(12)* in the industry that a sheet which is calendered while too moist will blacken. The usual explanation for this is the one given by Strachan *(11)*: that it is due to the pressing of the fibers, made sufficiently plastic by moisture, so hard that the optical-scattering surfaces of the sheet are lost and thus the sheet becomes somewhat transparent. Albert *(13)* believes the major cause for calender blackening of unfilled sheets is the crushing of fibers at fiber crossings.

In the rather limited discussion, Strachan *(14)* has considered the effect of fillers and moisture on the decrease in oil absorptivity of paper on calendering. As cellulose is a hydrous material, it has a lower absorptivity for oil than does some less hydrous material, such as clay. Hence, the presence of clay in the surface of a sheet will tend to increase this absorptivity. Calendering of sheets bruises the cellulose fibers in such a way as to form a film of even less absorptive material on the calendered surfaces. The formation of this film requires the presence of moisture; the film becomes less absorptive with higher contents of water in the fiber. It is the formation of this film that gives the peculiar properties to water-finished paper (a paper moistened and immediately supercalendered to give a very hard and resistant surface). It is quite obvious that the presence of an oil-absorptive clay in this resistant surface will increase its oil absorption.

Materials, Equipment, and General Procedures

Pulp

For all the experiments, the pulp furnish was 50 per cent bleached sulphite and 50 per cent bleached soda.

Clays

Four clays were used: a commercial bentonite clay obtained from western United States, a dehydrated clay (a standard commercial clay sold on the basis of this treatment), and two other clays, designated as C and D, which are typical papermaking clays widely used in the industry. The Clay D is principally noted for its fine particle size. Although no studies of the fundamental species of these clays were made, it is thought that the bentonite is principally montmorillonite and that Clays C and D are very nearly alike in their species—both containing considerable kaolinite and perhaps appreciable amounts of the more hydrous clay minerals.

Beater

The beater used to prepare the pulp for use was a standard 1½-lb. beater. The beater runs were made according to the standard method *(17)*, with these exceptions:

1. In lieu of the preliminary disintegration of the pulp with the standard equipment and the 5-min. slushing, the laps of pulp, soaked for several hours and torn into small pieces, were added to the beater partly filled with water and the mass was allowed to slush around for some 10 min. (including the time required for furnishing after an appreciable consistency has been reached).
2. A furnish of 50 per cent bleached sulphite and 50 per cent bleached soda was used.
3. A weight of 3500 g. was put on the bedplate.
4. Samples were taken out at various intervals to determine the freeness (standard self-lifting type Schopper-Riegler tester); no handsheets were made.
5. The beating was carried out just long enough to secure the desired freeness.

Agitator

The furnishes for the clay-filled handsheets were made up with the use of an agitator rather than in the beater. For each furnish, from which 24 hand-

sheets were made, a ⅛-h.p. Lightnin' agitator was used.

Calenders

In the calendering of the sheets, two different hand calenders were used, a pressure calender and a dye calender. The pressure calender consisted of two gear-meshed steel rolls, the clearance of which could be varied by a screw arrangement. This did not allow a measure of the clearance or the pressure during calendering, but an attempt was made to keep both constant throughout each experiment. The dye calender consisted of three rolls with only the bottom one driven. In addition to the pressure supplied by the weight of the rolls, pressure for calendering with this instrument is obtained by screwing down a pair of bolts making contact with the bearings on the top roll. However, this calender was not designed to give pressure calendering, so that it was used only incidentally in the experimental work. The results obtained with it agreed fairly well with those obtained using the pressure calender, but it is to be noted that the calendering with the pressure calender is entirely the result of pressure, whereas that with the dye calender is the combined result of pressure and friction. An idea of the amount of calendering given the sheets may be obtained from the fact that the sheets were in each case reduced in caliper from about 6½ mils to about 3 mils.

Handsheets

Handsheets were made very nearly according to the method given by Laughlin and Kress (*15*) and modified by Howells (*16*). The sheets were made on a sheet mold, 6¼ by 6¼ inches. Three liters of water were put into the mold and then one liter of the stock suspension (containing about 2 g. of moisture-free stock) was added. The mixer was pushed to the bottom of the mold twice fast and once slowly and then removed. The mold was immediately drained. The sheets were couched with new, dry blotters, 8 by 8 inches. In couching the sheet, one blotter was placed over the sheet on the mold, with the machine direction in the direction of couching, wire side down. Then the sheet was couched for five full rolls. The sheets were made at 56.5-lb. weights (moisture-free, 25 x 38—500) plus or minus 1.5 pounds.

After couching, the sheet and blotter were laid on a felt in the hydraulic press, blotter down. Another blotter was laid on top the sheet, wire side down and machine direction same as before, and a dry felt placed on top. In this way, two or three sheets were put one on top the other and pressed at the same time at 50 lb. per sq. in. for 30 seconds.

Ashing Procedure

To determine the filler content in the sheets, they were ashed in an electric muffle furnace at about 900 deg. C. to constant weight. The actual weight of the ash was corrected by a factor of 14 per cent to allow for the moisture in the original clay—a standard trade correction—and for the ash from the cellulose and alum, i.e., the ash in an unfilled sheet. Naturally, the 14 per cent correction was not made for the anhydrous clay.

Sheet Testing

The sheets were tested for brightness, opacity, gloss, and oil absorption. The brightness testing was carried out with the General Electric reflection meter. A pad four sheets thick was used in each case. The opacity was measured with the General Electric opacimeter. The gloss was taken with a Bausch and Lomb glarimeter which measures the gloss at an angle of 15 degrees. The oil absorptivity was measured by the Case ink test (also called the K and N ink smear Test). This test involves the absorption of a gray oil ink by the paper. The degree of ink absorption was measured by the loss of brightness of the sheet as the result of the ink absorption under standard conditions. The following procedure for the test was used: The ink was placed on the sheet (using a metal form) in a film 0.025 in. thick over an area one inch square. This film of ink was left in contact with the paper for a period of 30 seconds. Then it was scraped off with a spatula and the sheet wiped clean and dried. Brightness readings were taken at the same points both before and after the application of the ink.

Treatment of Handsheets

The procedure used for treating the handsheets was as follows:

1. Sets of handsheets were made containing each of the following filler clays: bentonite, the anhydrous clay, and Clays C and D mentioned above. Under exactly similar conditions, a set of sheets containing no filler was prepared. Some handsheets from each set were moisture-freed and rehumidified at 65 per cent relative humidity and 70 deg. F.; the rest were dried no further than to equilibrium with these conditions. Certain sheets, chosen from each set and each type of drying, were marked into strips 1¼ in. wide and 6¼ in. long. These strips were marked at intervals of 1 in. along their length. At the marked points brightness and opacity readings were made. Gloss readings were taken at three points along each strip (on the B. & L. glarimeter, the gloss reading is taken on a 1 in. by 4 in. area, the instrument reading the average gloss for the whole area).

2. The sheets were then brought to equilibrium at the proper atmospheric conditions (some in the humidity room at 65 per cent relative humidity and 70 deg. F. and the others in the laboratory with the air at a relative humidity of between 30 and 40 per cent and a temperature of around 65 deg. F.) and weighed. Immediately thereafter, the strips were cut and then calendered through the hand calender (the strips from the humidity room being kept in wax paper to maintain their moisture content until they were calendered). The brightness, opacity, and gloss values were again determined at the same places on each strip as before calendering.

3. Finally, Case ink test determinations were made on one strip of each moisture content for each type of clay filler. Three such tests were made on each strip.

Experimental Results

At the outset it was assumed that the plane-slippage phenomenon exhibited by the more hydrous clay particles should have some effect on the changes in the optical and surface properties of the clay-filled sheets upon calendering. To determine if this were true, clay-filled sheets (with each of the four different clays mentioned above) were calendered, and the changes in the optical properties were determind. The calendered sheets were then tested for oil absorption.

Both hand calenders were used in this work, the caliper of the sheets being reduced from 6.25 to 7.25 mils before calendering to from 2.75 to 3.25 mils after calendering. With the dye or friction calender,

only one sheet with each kind of filler was tested.[3] The calender was adjusted with ¼ turn on each of the pressure screws and each strip was calendered through the bottom nip three times.

The results are recorded in Table I. A mathematical study of the original data shows that the maximum probable error in the optical property differences recorded is less than 7 per cent.

In the work with the pressure calender, four sets of sheets were tested—each set consisting of one sheet with each kind of filler and one unfilled sheet. Two sets were of sheets which had been previously moisture-freed. At the time of calendering, one of these sets was in equilibrium with the laboratory air (30 to 40 per cent relative humidity at about 65 deg. F.) and one in equilibrium with air at 65 per cent relative humidity at 70 deg. F. The tests on these sheets were carried out according to the procedure given in the section, "Treatment of Handsheets," above. The results are given in Table II, Part A. The maximum probable error in the optical property differences recorded in this section of Table II is slightly under ten per cent.

Two other sets of sheets were simply air dried, i.e., not moisture-freed at all. One of these sets was allowed to come to each of the equilibrium conditions given above before calendering. The tests were carried out exactly as above. The results are given in Table II, Part B. The maximum probable error in the optical property differences recorded in this section of Table II is less than 7 per cent.

Conclusions

1. Within the limits of experimental error, the type of clay used as filler as a given moisture content does not in itself greatly influence the characteristics of the calendered sheet, excepting for the case of (a) the dehydrated clay which tends to favor less loss in brightness and opacity and to promote better oil absorbency and lower gloss, and (b) the extremely hydrous bentonite which does not behave in a manner greatly different from the kaolin excepting that it yields a sheet somewhat less receptive to printing oil.

2. In most instances, as might be expected, the sheets with greater moisture content tend, upon calendering, to suffer the most in loss of brightness and opacity on calendering, at the same time becoming glossier and less oil receptive. It is in this respect that the character of the clay used as filler appears to influence the properties of the sheet, in that variations in finishing properties due to variable moisture content of the sheet appear to be accentuated by the more hydrous clay and minimized by the dehydrated clay. These effects may be due to the part played by water in crystal plane cleavage in the clays.

3. These data and the deductions made from them are based upon laboratory and handsheet procedures.

[3] Considerable preliminary work of the same nature was carried out to adjust the various factors involved. The results from this work compared favorably with the results given in Table I, but they are not included herein, as they are not so reliable.

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TABLE I.—EFFECT OF VARIOUS CLAY FILLERS ON THE CHANGES IN OPTICAL AND SURFACE PROPERTIES OF CLAY-FILLED SHEETS ON CALENDERING WITH THE FRICTION CALENDER

Filler	per cent Moisture.	per cent Ash,	Brightness calendered Un-	Brightness endered Cal-	Brightness ference Dif-	Opacity Un-calendered	Opacity Cal-endered	Opacity Difference	Gloss Un-calendered	Gloss Cal-endered	Gloss Difference	Oil Absorption
None	5.88	...	71.0	64.5	6.5	84.2	77.2	7.0	3.9	33.1	29.2	23.3
Bentonite	5.81	14.0	70.0	62.7	7.3	88.2	80.0	8.2	3.7	36.2	32.5	18.1
Clay D	5.01	17.9	76.0	67.6	8.4	91.5	82.1	9.4	3.3	36.2	32.9	21.0
Clay C	5.07	15.1	77.7	68.1	9.6	92.2	81.6	10.6	3.1	40.3	37.2	22.3
Anhydrous Clay	5.14	14.9	74.9	68.4	6.5	88.2	82.6	5.6	3.5	34.7	31.2	24.2

TABLE II.—EFFECT OF VARIOUS CLAY FILLERS AND MOISTURE CONTENTS ON THE CHANGES IN OPTICAL SURFACE PROPERTIES OF CLAY-FILLED SHEETS ON CALENDERING WITH THE PRESSURE CALENDER

Filler	Moisture, per cent	Ash, per cent	Brightness Un-calendered	Brightness Cal-endered	Brightness Difference	Opacity Un-calendered	Opacity Cal-endered	Opacity Difference	Gloss Un-calendered	Gloss Cal-endered	Gloss Difference	Oil Absorption
A. Sheets moisture-freed and rehumidified												
None	6.47	...	69.8	64.6	5.2	85.3	79.1	6.2	3.4	25.1	21.7	22.4
	7.95		70.4	64.5	5.9	85.9	78.0	7.9	3.2	25.4	22.2	22.6
Bentonite	5.71	14.0	64.4	57.7	6.7	91.5	84.7	6.8	3.0	22.5	19.5	17.3
	7.48		65.0	56.3	8.7	91.0	80.8	10.2	3.0	27.8	24.8	12.9
Clay D	4.87	17.9	74.1	66.5	7.5	93.0	85.7	7.3	3.0	24.0	21.0	21.5
	6.40		74.0	67.1	6.9	93.0	84.4	8.6	3.0	22.5	19.5	22.0
Clay C	5.13	15.1	74.3	68.3	6.0	95.2	88.0	7.2	2.9	20.8	17.9	23.1
	6.43		74.4	67.7	6.7	94.3	86.4	7.9	3.0	19.4	16.4	21.3
Anhyd. Clay	5.83	14.9	70.4	67.2	3.2	90.3	87.1	3.2	3.3	19.3	16.0	27.3
	6.52		70.2	66.6	3.6	90.7	86.5	4.2	3.3	20.2	16.9	24.3
B. Sheets air dried only—not moisture-freed												
None	7.24	...	71.2	66.4	4.8	84.1	77.9	6.2	3.5	22.6	19.1	22.8
	8.77		70.9	64.3	6.6	84.0	73.3	10.7	3.4	25.8	22.4	21.4
Bentonite	6.37	14.0	70.5	64.1	6.4	88.5	81.9	6.6	3.3	20.5	17.2	21.3
	8.57		71.0	60.8	10.2	88.2	75.7	12.5	3.1	28.8	25.7	13.0
Clay D	5.35	17.9	75.9	69.2	6.7	92.6	84.2	8.4	3.0	21.3	18.3	23.6
	7.27		76.0	68.3	7.7	91.6	81.0	10.6	3.0	23.5	20.5	20.7
Clay C	6.26	15.1	78.2	69.7	8.5	93.5	81.6	11.9	3.0	25.3	22.3	23.0
	7.47		78.4	69.0	9.4	93.2	80.6	12.6	2.9	28.9	26.0	22.0
Anhyd. Clay	6.51	14.9	75.3	71.2	4.1	89.1	82.5	6.6	3.5	21.7	18.2	26.4
	7.57		75.6	70.8	4.8	88.6	81.6	7.0	3.3	22.1	18.8	25.3

The Relation Between Sheet Strength and Fiber Surface Conditions*

By Henry Philip Dixson, Jr.[1]

Abstract

1. The hydrophilic character, i.e., the capacity to absorb or adsorb water, of fiber surfaces is the predominant factor which causes fibers to bond and thus give strength to a sheet of paper.

2. The hydrophilic character of unbeaten pulp fibers is increased by treating suspensions of bleached sulphite with locust bean gum, cellulose gel, and gelatin. Handsheets of various apparent densities obtained by varying the wet pressing pressure were made and evaluated for strength properties.

3. The hydrophilic character of unbeaten bleached sulphite fibers was reduced by treatment with Duponol WA (sodium lauryl sulphate).

4. The hydrophilic character was measured by the relative amounts of water bound to the various hydrophilic colloids, bleached sulphite, and bleached sulphite treated with Duponol WA. The amount of bound water was determined by a modification of the method of Gortner and Gortner. By measuring the alkali-binding power, the hydrophilic nature of treated bleached sulphite fibers as measured by bound water experiments was confirmed. The strength of the handsheets made from the fibers treated with materials to change the hydrophilic nature was in the same order as the amount of water bound by the materials added.

5. Wetting agents are either without effect or are detrimental to the strength of sheets made from treated pulp because the agents are less hydrophilic than the cellulose. Wetting agents are of value only where one component of a cellulose system is hydrophobic.

A large number of surface-active compounds have come into industrial use recently as wetting agents, emulsifiers, detergents, and penetrants. These compounds have been used in the pulp industry to shorten the reduction time of hard-sized broke, to assist in deinking old papers *(1)*, and to aid in processing latex and absorbent papers.

Since surface-active compounds, even in very dilute solution, reduce the surface tension of water and cause very rapid penetration of water into textiles. it would seem worth while to investigate the effect of such agents upon the beater processing of pulp. The beating and sheetmaking processes are chiefly concerned with the cellulose-water relationship and, in spite of a large number of investigations, the change in cellulose-water systems during beating and sheet formation is not very well understood. It is quite possible that experiments with surface-active compounds in small concentrations which reduce the surface tension might throw some light on the changes taking place in the formation and drying of a paper web.

Gortner *(2)* has given a simple picture of wetting. He stated that, if a drop of a liquid is placed on a solid surface, the resulting equilibrium will be determined by the surface tension of the solid a_s, the surface tension of the liquid a_l, and the interfacial tension of the solid-liquid a_{ls}. If a_s is greater than $a_l + a_{ls}$, the drop will spread and become a film on the solid surface. If, however, a_s is less than $a_l + a_{ls}$, there will be a definite contact angle between the solid and the drop.

The above concept of wetting and the role of surface-active compounds are not strictly applicable to very porous surfaces. Adams *(3)*, in a discussion of detergent action and wetting, has stated that for porous surfaces, $a_a \cos \Theta = W_{as} - a_a$ must be as large as possible instead of merely $\cos \Theta$, as in the case of a plane surface; Θ is the contact angle, a_a is the surface tension of water, and W_{as} is the adhesion between solid and liquid. When a solution is adsorbed by a fiber *(4)*, the permeation is due to capillary attraction. The greater the surface tension and the lower the viscosity, the more rapid will be the penetration, providing the contact angle ($\cos \Theta$) is unity, i.e., the surface is perfectly wetted.

Wetting agents make $\cos \Theta$ approach unity on surfaces where the contact angle is small. Therefore, in maximum penetration of capillary hydrophobic surfaces, just enough wetting agent must be added to attain some intermediate position between maximum penetration due to capillary attraction and a perfectly wetted surface.

Harrison *(5, 6)* has carried out investigations on the use of wetting agents in beaters. He found that pulp did not develop as rapidly in the presence of surface-active compounds. Noll *(7)* found that the beating action decreased as the surface tension decreased.

Concepts of "Hydration"

In this paper, the term "hydration" as applied to pulp refining will be discarded so that it will not become confused with true chemical hydration. In place of "hydration" the term "pulp development" will be used to indicate the refining processes in which pulp fibers become increasingly slimy, fibrillated, and reluctant to part with water, and in which the sheets of paper formed from these pulp fibers become increasingly strong to a maximum point and then become weaker and translucent.

Broadly speaking, there have been three concepts of hydration: the chemical, the physical, and the physicochemical or colloidal. The first two have generally been discarded by such investigators as Harrison *(5)*, Campbell *(8)*, Bell *(9)*, and Kress and Bialkowsky *(10)*. The physicochemical theory held by Harrison *(5, 11)*, Campbell *(8)*, Bell *(9)*, Cottrall *(12)*, and Clarke *(13)* involves fibrillation as one of the chief factors causing strength in paper, but it also includes a mechanism of fiber-fiber bonding.

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The mechanism of fiber-fiber bonding is not very well understood. Campbell *(8)* has proposed the idea that the surface layer of cellulose is in solution and that fibers, brought into intimate contact by either pressure or surface-tension effects, form a bond of transition crystal layers on drying. Cottrall *(12)* believed that free —OH groups are very reactive and that at fiber-fiber surfaces these groups tend to unite. If two wet fibers are in intimate contact and drying takes place, the water bound to the —OH group is driven off and the group will tend to be attracted to and bond with some other adjacent —OH group which has lost its water. If this —OH group happens to be one associated with the fiber in intimate contact, the phenomenon of fiber-fiber bonding takes place. This idea has been expressed also by Mark *(14)*.

It is clear that fiber-fiber bonding and also fibrillation are intimately associated with the relationship of cellulose to water. Most discussions on this subject are centered on the problem of how and to what extent water is bound to cellulose. Maass and Campbell *(15)* hold that water sorbed by cellulose is retained in two ways. The first is "bound" water and the second is held under tension in capillaries. Peirce *(16)* found that moisture adsorption occurs in two phases, in one of which one molecule of water attaches itself to one hexose group, whereas in the other an indefinite number of molecules are loosely adsorbed on all available surfaces, being limited only by conditions of space and external vapor pressure.

It is well to point out the hydrous condition of other materials present in pulp besides cellulose. Klingstedt *(17)* has observed that, since the materials in beta-cellulose are easily peptized by bases, it is possible that they are easily hydrated on beating. Haas and Hill *(18)* stated that beta- and gamma-celluloses may differ from alpha-cellulose only in the degree of polymerization, hydration, or dispersion. Schorger *(19)* claimed that pentosans are much more hydrophilic than hexosans.

From the above brief discussion of the theories proposed for the cellulose-water relationship and those of beating and sheet formation, it is apparent that there must be a close relation between the condition and amount of water retained on fiber surfaces and the sheet-forming characteristics of these fibers. Experiments have been carried out employing variable surface tension conditions, and variations of the hydrophilic character of pulp fiber surfaces by the use of surface tension depressants and several highly hydrophilic colloids. The effects of these variations on pulp fiber surface characteristics and upon sheet formation have been observed and are reported below.

Experimental Procedures

A large number of experimental procedures have been followed, but in most cases they have been based on the following general methods.

Ball mill runs were carried out as follows. Ninety g. (moisture-free basis) of pulp in 2 liters of water were disintegrated 75,000 revolutions in the British disintegrator. The pulp was then washed into a porcelain-lined 10¾ by 13½-in. Abbé ball mill with 1 liter of water (3 liters total water). Seventy-seven flint pebbles (weight 5000 g., volume 1892 cc., pebbles 60 to 70 g. each) were added and the mill rotated at 60 r.p.m. After the desired number of revolutions, the pulp and pebbles were removed and separated and the pulp was diluted to 10 liters. This pulp suspension was stirred with a small "Lightnin'" mixer for 15 minutes.

Handsheet formation, Mullen strength, and tearing strength measurements were carried out by TAPPI standard methods T205 m-36, T403 m-36, T414 m-37, respectively. Sheet thickness was determined by a Schopper caliper; five determinations were made on each sheet. The apparent density of the sheets was determined by dividing the ream weight (25 x 40—500) by the caliper expressed in thousandths of an inch. The folding endurance was measured on the M.I.T. folding endurance tester.

Surface tension measurements were made on the du Nöuy interfacial tensiometer (Central Scientific Company, Model No. 70540). Except where otherwise specified, measurements were made as follows. All glassware was boiled in sulphuric acid-potassium dichromate cleaning solution and rinsed with distilled water. Before each measurement, the tensiometer ring was flamed over a Bunsen burner, washed, and flamed again. The sample was then stirred violently and a small portion poured into the tensiometer cup. In the case of pulp suspensions, the pulp was held back with a stirring rod, and only the liquor was allowed to flow into the cup. The tensiometer ring was then lowered below the surface of the liquid, and, after exactly one minute, the ring was pulled through the surface at a uniform rate. The reading was taken when the ring broke through the liquid surface. This reading was multiplied by 0.94, which is a constant depending upon the ring diameter and was supplied with the operating directions.

Preparation of Colloidal Systems

Cellulose gel was prepared as follows: fifteen g. of air-dry cotton linters (98.5 per cent alpha-cellulose) were added to 2 liters of cuprammonium hydroxide solution. Care was taken to exclude air as much as possible, and the mixture was allowed to stand in the dark for 3 days. At frequent intervals the bottle was shaken on a motor-driven rocking device. After the 3-day dispersion period, the cellulose was found to be completely dispersed. The dispersion was then run slowly into 20 liters of cold distilled water which was moderately agitated; the cellulose precipitated as a light blue floc. The precipitate was allowed to settle overnight in a stoppered bottle. The clear supernatant liquid was then siphoned off and the precipitate filtered in small portions on a large Büchner funnel. The wet, amorphous cellulose was washed in small portions with 10 per cent acetic acid on a Büchner funnel until the blue color disappeared. During the washing, the cellulose changed to a gelatinous mass.

The colorless cellulose gel was washed with distilled water until the filtrate was neutral to litmus. The material was placed in 2 liters of water and agitated 30 min. in a British disintegrator. The resulting gel had the appearance of a starch suspension and did not settle out.

A 0.25 per cent locust bean gum suspension was prepared by adding slowly, and with agitation, 8.82 g. of Italian locust bean gum to 3450 cc. of cold water. The temperature was then slowly raised to 85 deg. C., and the solution was allowed to cool. The dispersion was used 3 hr. after preparation. A 0.25 per cent gelatin dispersion was made by adding the requisite quantity of pure sheet gelatin to warm water. The gel was allowed to cool before it was added to the pulp.

Methylcellulose was precipitated on pulp in the following manner. Twenty g. of commercial methylcellulose (about 5 per cent methoxyl content) was treated with 170 cc. of cold water. After allowing the methylcellulose to soak for 1 hr., 26.8 g. of 50 per cent cold sodium hydroxide were added and the constituents kneaded with a stirring rod. After thorough mixing, the methylcellulose was diluted to 5 per cent by adding 184 cc. of water. The resulting methylcellulose solution was a thick, clear, viscous dispersion. The desired amount of methylcellulose was added to a 0.9 per cent pulp suspension and stirred slowly for ¾ of an hour. The alkalinity was then reduced by adding 10 per cent acetic acid until a phenolphthalein end point was obtained.

Pulp was mordanted with a tannic acid solution prepared by adding 20 g. of tannic acid to 1300 cc. of warm water. Enough pulp was then added to make a 0.9 per cent suspension, after which the mixture was brought to 80 deg. C. and allowed to cool slowly. The tannic acid-treated pulp was filtered on a Büchner funnel, and the pulp fibers were diluted to 1300 cc. with water containing 10 g. of tartar emetic. This procedure mordanted the tannic acid to the fibers. After 15 min. of slow agitation, 5 g. of sodium carbonate were added, and the suspension was filtered on a Büchner funnel. The pulp was again diluted to 0.9 per cent consistency with water containing 5 g. of tannic acid and made into sheets.

Determination of Bound Water

The degree of hydration of colloidal materials was measured and correlated with sheet strength. The meaning of the term hydration is certainly not clear, particularly in the paper industry. Hydration, in the chemical sense, means the actual binding of water. However, the term has been loosely extended to include water held by capillary forces as well as that held by secondary valence. The line of differentiation between bound and capillary water is difficult to find in many cases. Therefore, the term hydration must be given an empirical limitation. For example, Newton and Gortner *(20)* considered "bound water" as that water which is not available as a solvent for sugar in a colloidal system.

Newton and Gortner *(20)* and Gortner and Gortner *(21)* have been successful in making bound water measurements on plant materials by the cryoscopic method. They measured that water bound to a colloid which was not available as a solvent for sucrose. The sugar concentration was measured by the freezing point depression of the solution.

The validity of the determination as an absolute measure is dependent upon two factors. First, the colloid must not sorb sugar in preference to water and, secondly, the bound $\rightleftarrows$ free water equilibrium must not shift appreciably with change of temperature. Sugar and glucose are both negatively sorbed by pulp *(22)*. The equilibrium between free and bound water probably changes during the freezing point determination; however, only relative measurements are necessary for the present investigation.

The procedure employed is as follows. The freezing point depression of a sugar solution containing 0.3427 g. of sugar per g. of water was determined with the customary freezing point apparatus. A Beckmann thermometer calibrated to 0.01 deg. C. was used to measure the temperature, and estimations were made to a thousandth of a degree. The freezing point was first determined approximately. Afterward, each sample was supercooled 0.1 ± 0.020 deg. C. A very small ice crystal was introduced and the system agitated very rapidly. The temperature then rose quickly to a constant value. This was taken as the freezing point. For any colloidal system under consideration, the moisture-free weight was determined. Preliminary experiments were carried out to determine the maximum concentration which could be used and still have sufficient mobility at the freezing point so that agitation was not too severely impaired.

A sample of the colloid containing this maximum amount of dry material was weighed. Let A be the water in this sample. On the basis of approximately 100 g. of total water in the final system, a portion of water B, i.e., $(100 - A)$, was weighed out and sufficient sugar was added to B to give a sugar concentration of 0.3427 g. per g. of water in the mixture of A and B. After the sugar was dissolved, the weighed colloid was added and mixed thoroughly. The system was allowed to stand 1 hr. to attain equilibrium. A measurement made after 48 hr. showed that the 1-hr. period was sufficient.

After the 1-hr. period, a portion of the solution was removed, and a freezing point was determined as described above. Ten determinations were made on each sample. The freezing point depression of the colloid in the absence of sugar was also determined. It was found that a pulp suspension did not depress the freezing point.

If Δ_s is the freezing point depression of pure sugar, Δ_c the depression of the colloid, and $\Delta_{(c+s)}$ the freezing point depression of the mixture, the bound water may be calculated by the formula of Newton and Gortner *(20)*: weight of bound water equals

$$\frac{[\Delta_{(c+s)} - (\Delta_c + \Delta_s)]}{\Delta_{(c+s)} - \Delta_c} \text{ (weight of water in system)}$$

The percentage of hydration is determined by dividing the grams of water bound by the moisture-free weight of the colloid.

As there was no measurable Δ_c for pulp suspensions, the presence of the pulp during the freezing point determination was not necessary. To facilitate the freezing point measurement, the sugar liquor was pressed from the pulp-sugar-water system after equilibrium was attained. The freezing point depression of this sugar solution was determined. The removal of the fibers from the system eliminated the mechanical difficulty experienced in attaining rapid agitation of the system as freezing occurred.

A verification of the method as a means for evaluating hydration was made on starch-soap systems prepared by Heald *(23)*. The results agreed with his measurements of hydration by turbidity and electrical measurements.

Alkali-Binding Power of Pulp

The amount of sodium hydroxide removed from solution by pulp was used as another measure of its hydrophilic nature. This was used by Jahn and McCarthy *(24)* as a measure of pulp development. Bialkowsky *(25)* has shown that pulps remove alkali from dilute solutions. Downs *(26)* extended this work and found that the binding of alkali was due in part to the acid constituents of the pulp and in part to sorption. Repeated alkali extractions resulted in decreasing alkali binding until a constant value, representing sorption only, was obtained.

The following procedure was employed for deter-

mining the alkali-binding power of pulps. To exactly 5 g. (moisture-free basis) of pulp, 60 g. of distilled water and 50 cc. of 0.01 *N* sodium hydroxide were added. The mixture was stirred well, and the tightly stoppered bottle was placed in a water bath at 30 deg. C. for 24 hours. The sample was removed, and the liquor was filtered from the pulp on a small Büchner funnel. The pulp acted as the filter pad. The liquor was poured through the pad the second time. Fifty cc. of the filtrate were titrated with 0.01 *N* sulphuric acid to a phenolphthalein end point. From this titration, the milligrams of alkali retained by the pulp were calculated. Results were expressed as the percentage of the original sodium hydroxide removed by the pulp. In cases where foreign materials were added to the pulp, e.g., locust bean gum, glue, and wetting-out agents, a blank sample was titrated with 0.01 *N* sodium hydroxide to determine if a correction should be applied for acidity introduced into the pulp. As only one pulp was used, repeated alkali extractions were not undertaken since the acid constituents would be constant for a given pulp.

Results and Discussion

Effect of Wetting Agents

Ball mill evaluations of pulp in the presence of wetting agents were made, in which 2 g. of the desired wetting agent were added to each charge. After the milling period, half of the pulp was very thoroughly washed. Sheets were made from the pulp still containing the wetting agents and from the washed pulps. The results of this procedure for Duponol WA and Onyxsan S are shown in Fig. 1. It

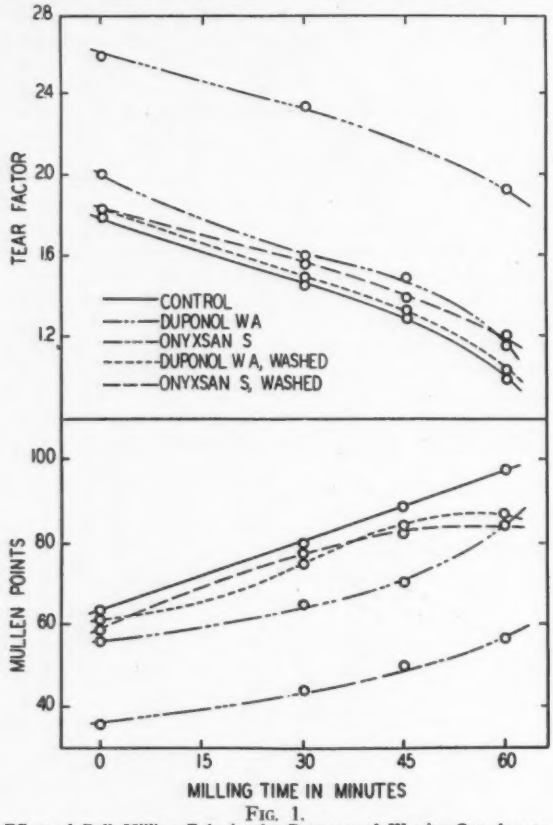

Fig. 1.
Effect of Ball Milling Pulp in the Presence of Wetting-Out Agents on Strength

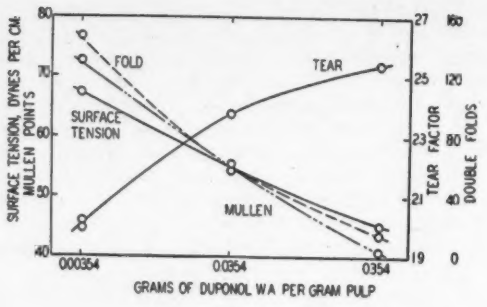

Fig. 2.
Effect on Strength of Adding Duponol WA to Beaten Pulp

was noted that the chief cause of a reduction in strength was due to the presence of the surface-active material during sheet formation and drying. The great difference between Duponol WA and Onyxsan S is due to their colloidal nature. Onyxsan S has a positive potential and cellulose has a negative charge, but Duponol WA is negative as are most surface-active agents. Thus, Onyxsan S would be much more strongly sorbed on cellulose than Duponol WA.

Harrison *(5, 6)* claimed that the decrease in rate of ball milling might be due to frothing. This has been largely disproved by observations on the behavior of Duponol WA and Onyxsan S. No foaming was noted when positively charged Onyxsan S was ball milled.

Campbell *(8)* has proposed that sheet shrinkage and the forces which bring fibers into intimate contact so that fiber-fiber bonds will form are due to the surface tension of the water held in the interstices of the fiber mat. When water in a sheet is removed to the extent that only thin layers exist between fibers, the water tends to draw the fibers together. This force, based on the surface tension of water at 75 dynes per cm., is 150 dynes per cm. of fiber length, if two fibers are lying parallel to each other. In a qualitative study, pulp was treated with Duponol WA. The results are shown in Fig. 2. It might be concluded from these data that Campbell's theory had been verified. However, further work has shown that the surface tension idea is not wholly adequate. Two experiments were especially indicative.

In all pulps treated with wetting agents, the equilibrium moisture content was found to be slightly but persistently lower. In another experiment sheets were made from pulp beaten 75 min. and treated with Duponol WA (0.3 g. per sheet). These sheets were wet pressed until the solid fraction, i.e., concentration of fibers per unit volume, was identical to that of the untreated sheets. The results are shown in Table I. Even when the low surface tension conditions of the sheets treated with wetting agent were supplanted by mechanical pressure, the physical characteristics of the sheet did not return to normal. The presence of wetting-agent molecules, as well as surface tension effects, must be responsible for the loss of strength.

TABLE I.—EFFECT OF WET PRESSING TREATED SHEETS TO THE SAME DENSITY AS UNTREATED SHEETS

Sheet treatment	Untreated pulp	Treated pulp	Treated pulp
Wet pressing pressure, lb./sq. in.	100	100	125
Apparent density	15.71	15.00	15.71
Gurley density	1625	154	160
Double folds	1903	178	160
Tear factor	1.08	1.30	1.27
Mullen points	101	78.6	77.6

Effect of Wetting Agents on Colloidally Bound Water

Since the reduction in equilibrium moisture content is not sufficient to explain the large losses in strength, it is possible that the manner in which water is held by fibers has been affected by the sorption of polar molecules. If a sorbed polar molecule should reduce the hydrophilic nature of a fiber surface by virtue of the large hydrocarbon portion, and if such fibers would not form fiber-fiber bonds when brought into close contact, it would demonstrate the importance of the hydrophilic character of the fiber surface.

The bound water determination by the cryoscopic method as outlined in experimental procedures was employed to test this hypothesis. The results are given in Table II. The observed large decrease in the hydration of cellulose surfaces in the presence of surface-active agents was rather unexpected. However, an excessive amount and an excessive sorption period were employed. The hydration of untreated cellulose fiber was also higher than expected. Stamm *(27)* has found the fiber saturation point of wood to be about 27 per cent. In aqueous suspension, it is possible that more water is associated with cellulose than is measured on fibers at 100 per cent relative humidity.

TABLE II.—EFFECT OF SORBED WETTING AGENT ON THE PERCENTAGE OF HYDRATION OF PULP FIBERS

Sample	Dry colloid g.	Water g.	Sugar added g.	$\Delta_{(c+s)}$ deg. C.	Water bound g.	Hydration %
Duponol treated..	1.818	99.280	34.2440	2.122	0.09	5
Duponol treated..	1.818	99.280	34.2440	2.124	0.18	9
Duponol treated..	1.818	99.280	34.2440	2.123	0.13	7
Average percentage of hydration of Duponol-treated sheets...						7
Untreated	4.765	100.055	34.2888	2.153	1.54	32
Untreated	4.765	100.055	34.2888	2.156	1.67	35
Untreated	4.765	100.055	34.2888	2.155	1.62	34
Untreated	4.765	100.055	34.2888	2.153	1.54	32
Average percentage of hydration of untreated sheets.....						34

Δ_s Without pulp 2.120 deg. C.; Δ_c 0.00 deg. C.

It was pointed out in the discussion of the alkali-binding procedure that the alkali-binding power of cellulose may be used as a measure of the hydrophilic character of pulp. A 5-g. sample of pulp was treated with 1 g. of Duponol WA for 24 hr. at 0.9 per cent consistency. This sample was filtered on a Büchner funnel, and the alkali sorption was measured. Blanks were run on untreated samples and those treated with Duponol WA, and it was shown that the agent did not affect the acidity of the pulp. The alkali-binding results are shown in Table III. The results confirm the cryoscopic experiments, and it may be concluded that surface-active molecules reduce the hydrophilic nature of pulp; this fact accounts, in part at least, for the loss of strength in handsheets.

TABLE III.—EFFECT OF SORBED DUPONOL WA ON THE ALKALI BINDING OF BLEACHED MITSCHERLICH PULP

Sample	0.01 *N* H_2SO_4 cc.	Normality of filtrate	NaOH in filtrate g.	NaOH bound g.	Binding %
Treated	6.00	0.00120	0.00520	0.01460	73.8
Untreated	3.60	0.00072	0.00302	0.01668	85.0

Hydrophilic Character of Fibers and Sheet Strength

Since wetting agents have been shown to decrease the hydrophilic nature of pulp, studies were undertaken in which the hydrophilic character of pulp was increased by the addition of several hydrophilic materials. It was assumed that these materials coated the fibers and thus produced a more hydrophilic surface. Gelatin, locust bean gum, and a cellulose gel were selected as the hydrophilic colloids. These materials were compared with Duponol WA in their effect on pulp fibers.

The hydrophilic character of gelatin has been the subject of numerous investigations, and its affinity for water is well known. Locust bean gum is almost pure hemicellulosic material which is extremely hydrophilic and forms viscous gels at high dilutions. The cellulose gel was prepared from a high alpha-cellulose to demonstrate the hydrophilic character of a pure, finely dispersed cellulose. Before dispersion, the alpha pulp had a copper number of 0.075. After the treatment, the copper number had increased to only 0.146, and degradation was assumed to be very slight.

Doughty *(28)* has shown that the solid fraction of cellulose per unit volume is the controlling factor which determines sheet strength after the first few minutes of beating. Pulps treated with various hydrophilic materials were pressed at different wet-pressing pressures (to vary the solid fraction) so that strength characteristics could be compared at a constant solid fraction. The number of fibers of a given kind in a given volume would be practically the same at a fixed density. Thus, the comparison of sheet strengths at a given solid fraction (apparent density) would be a comparison of the ability of a given number of fibers to form bonds.

The hydrophilic materials were added to unbeaten bleached sulphite pulp at 0.9 per cent consistency in a quantity of 0.15 g. per sheet and stirred for 1 hour. Since Duponol WA is only 50 per cent sodium lauryl sulphate, 0.3 g. per sheet was employed. The results of these experiments are given in Figs. 3 and 4. Pulp processed in the ball mill was also pressed to various densities, and the results given in Figs. 5 and 6 are offered for comparison with pulps treated with various hydrophilic materials. In Table IV the percent-

TABLE IV.—PERCENTAGE HYDRATION OF VARIOUS HYDROPHILIC MATERIALS AS DETERMINED BY THE CRYOSCOPIC METHOD

Sample	Dry colloid g.	Water added g.	Sugar added g.	$\Delta_{(c+s)}$ deg. C.	Δ_c deg. C.	Water bound g.	Hydration %	Average hydration %
Average for untreated pulp (from Table II).....								34
Average for Duponol WA treated pulp (from Table II).....								7
Locust bean gum	0.214	99.786	34.1967	2.212	0.000	4.16	1940	1940
Cellulose gel	1.030	99.820	34.2170	2.383	0.208	2.53	250	241
Cellulose gel	1.030	99.820	34.2170	2.375	0.204	2.36	233	....
Gelatin	1.000	99.947	34.2620	2.168	0.008	1.85	185	194
Gelatin	1.000	99.947	34.2620	2.170	0.006	2.03	203	....
Alpha wood pulp	4.625	100.375	34.3985	2.141	0.000	0.966	21	....
Alpha wood pulp	4.625	100.375	34.3985	2.140	0.000	0.936	20	23
Alpha wood pulp	4.625	100.375	34.3985	2.145	0.000	1.170	25	....
Pulp milled 60 min.....	4.779	100.041	34.2841	2.155	0.000	1.62	34	....
Pulp milled 60 min.....	4.779	100.041	34.2841	2.155	0.000	1.62	34	33
Pulp milled 60 min.....	4.779	100.041	34.2841	2.154	0.000	1.58	33	....
Pulp milled 60 min.....	4.779	100.041	34.2841	2.153	0.000	1.53	32	....

Δ_s in absence of pulp 2.120 deg. C.

age hydration of various materials as determined by the cryoscopic method are given. The hydration of locust bean gum, cellulose gel, and gelatin was measured on the material in the form in which it was prepared. In Table V, the values of the Mullen strength taken at a constant apparent density of 14.0 from Figs. 3 and 5 are compared with the degree of hydration of materials added to unbeaten pulp. A striking parallel is definitely shown.

TABLE V.—COMPARISON OF MULLEN STRENGTH OF HANDSHEETS WITH THE DEGREE OF HYDRATION OF MATERIALS ADDED TO PULP

Material	Mullen points	Hydration %
Unbeaten pulp treated with Duponol WA....	42	7
Unbeaten pulp	69	34
Gelatin	75	194
Cellulose gel	77	241
Locust bean gum	95	1940

The conclusion may be drawn that the ability of pulp fibers to form fiber-fiber bonds is dependent upon the hydrophilic character of the fiber surface. This concept is supported by Campbell *(8)*. He pointed out that the surface of cellulose must be in solution, or rather the surface molecules must be continually dissolving and others redepositing on the cellulose.

Probably only a few of the cellulose macromolecules are very far away from the surface, and it is not difficult to visualize a layer on cellulose surfaces composed of dissolved cellulose and water held at a reduced activity by the cellulose surface. The bound-water measurement probably gives an index of the amount of the water held under the conditions just outlined. If two cellulose surfaces are brought closely enough together so that the cells of cellulose solution meet, drying will cause the fibers to stick together by the same mechanism which causes glue to bind, or two wet crystals to stick together on drying.

Materials vary in respect to their ability to bind water at their surfaces. If cellulose is coated with materials which bind water more strongly than cellulose, the active layer will be much thicker. Thus, more fiber-fiber bonds will form when fibers are brought close to each other than would ordinarily form without the thickened active layer of hydrated material.

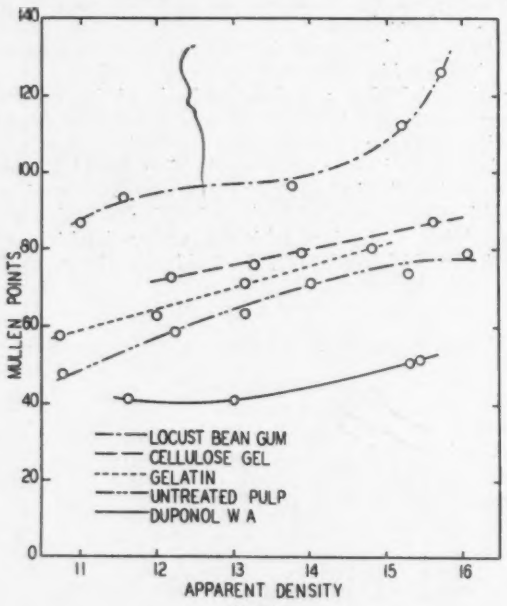

FIG. 3.

Effect of Various Hydrophilic Materials on the Bursting Strength of Sheets at Different Apparent Densities

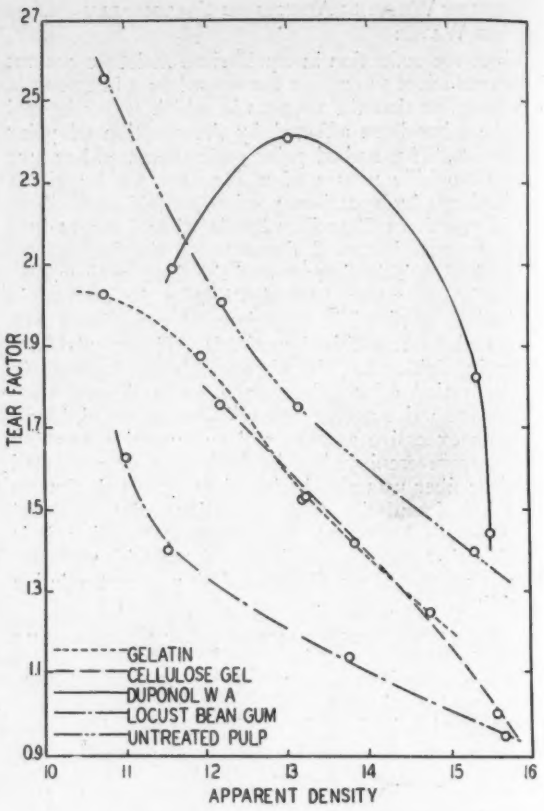

FIG. 4.

Effect of Various Hydrophilic Materials on the Tearing Strength of Sheets at Different Apparent Densities

If a polar molecule is sorbed on a cellulose surface, the hydrophilic portion will be anchored to the hydrophilic cellulose. The large hydrophobic portion will orient away, and the sphere of influence of the hydrocarbon will reduce the tendency of cellulose to partially dissolve and form a hydrated layer. Hence, the probability that the cellulose will form fiber-fiber bonds is reduced. The hydrophilic character of pulps varies to a great extent, because they contain varying amounts of hemicelluloses which are extremely hydrophilic, as was shown by the water-binding power of locust bean gum. Generally speaking, the more a pulp is purified, the less hydrophilic it becomes. This is demonstrated by the increased amount of beating necessary to produce a given strength *(29)*. The water-binding power of high alpha wood pulp was less than that of ordinary bleached sulphite which contains hemicellulose (Table IV). It is not to be implied that pure cellulose is not hydrophilic; in fact, it is extremely so; but cellulose fiber differs from other gels in that the macromolecules are bound in a rigid structure as fiber walls. In the nonfibrous gel state, cellulose shows relatively high hydrophilic character, but it is not comparable to hemicellulose.

Figures 5 and 6 show that ball milling produced the same effect as adding hydrophilic materials, yet no change in the degree of hydration could be measured

by the cryoscopic procedure. The effect was not as anomalous as it appeared. The same result, i.e., an increase in sheet strength, was attained by a different method. When fibers are beaten, the external area increases, and the fibers become more pliable *(8)*; hence the probability of fiber-fiber bond formation is greater.

Sheet Density and Tearing Strength

It is interesting to note that the tearing strength was almost the reciprocal of the bursting strength (Figs. 3, 4, 5, and 6). It is usually assumed that tearing strength loss during beating is due to fiber cutting. Little cutting takes place in the ball mill, and the reduction in tear must have been due to the formation of fiber-fiber bonds. The sharp decline of tear below a certain critical amount of bonding was indicated by the curve for Duponol WA-treated fibers. Sheets were made by suspending dry fibers in dry butyl alcohol and forming the sheets on a piece of Fourdrinier wire placed in the bottom of a Büchner funnel. The sheets were pressed at a pressure of 300 lb. per sq. in. for 3 min. between blotters and dried on British plates and rings. The bursting strength was nearly zero. The tearing strengths for various beating periods are given in Table VI and are a measure of the fiber entanglement.

TABLE VI.—EFFECT OF MAKING HANDSHEETS IN DRY BUTYL ALCOHOL

Beating time min.	Tear factor	Apparent density	Basis weight lb.	Caliper thousandths of an inch	Mullen points
0	0.76	10.60	53.4	5.00	0.8
45	1.20	9.68	52.7	5.45	0.9
60	1.29	9.60	53.0	5.50	0.9

It may be concluded that, for a given fiber furnish in a pulp-processing apparatus, the tearing strength is inversely proportional to the bursting strength, and an increase in this strength will be attended by a proportional loss in tearing strength. In other words, the tearing strength is inversely proportional to the fiber-fiber bonding above a certain small degree of fiber bonding essential to hold the sheet together.

Fiber-Fiber Bonding and Hydrophilic Nature

The hypothesis has been advanced that the ability of fibers to form fiber-fiber bonds is dependent upon the hydrophilic nature of the fiber surface, other factors being equal. Various experiments designed to test further this hypothesis have been made.

Bleached sulphite pulp was mordanted with tannic acid to make it less hydrophilic. Tannic acid is well known as a dehydrating agent in colloidal systems. Sheets made from these fibers were compared with sheets treated with Duponol WA, locust bean gum, gelatin, and methylcellulose. Strength characteristics and alkali-binding power were compared. The alkali binding of tannic acid-treated fibers could not be measured due to the high acidity. The results are given in Tables VII and VIII.

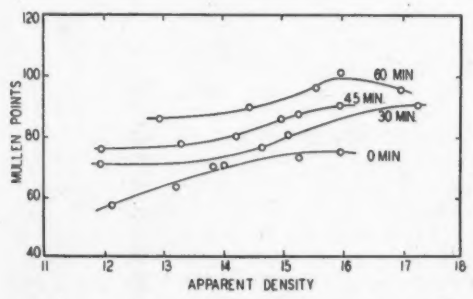

FIG. 5.
Effect of Beating on Mullen Strength of Sheets Made at Different Apparent Densities

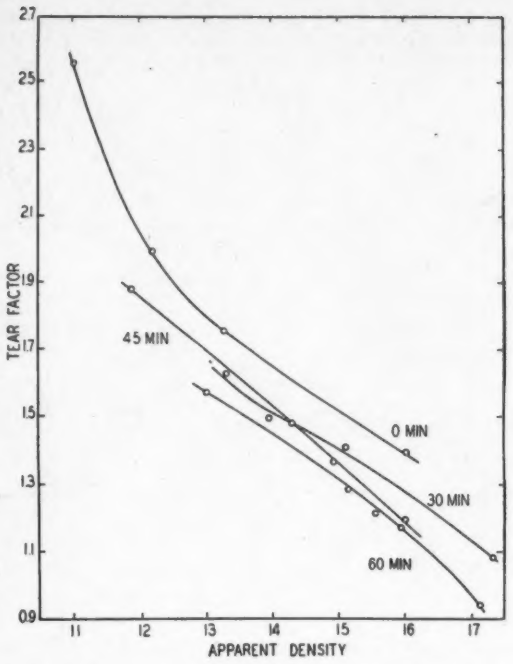

FIG. 6.
Effect of Beating on Tearing Strength of Sheets Made at Different Apparent Densities

TABLE VII.—EFFECT OF CHANGING THE HYDROPHILIC CHARACTER ON STRENGTH OF HANDSHEETS

Treatment	None	Tannic acid	Gelatin	Methyl-cellulose	Duponol WA	Locust bean gum
Basis weight, lb.	45.1	44.1	48.8	52.5	48.1	47.5
Mullen points...	56.4	0.0	66.6	99.0	31.6	95.5
Tear factor.....	2.12	0.65	1.86	1.02	2.31	1.30
Double folds....	49	0	89	1586	9	628
Apparent density	11.9	8.0	12.3	13.8	11.3	13.1

TABLE VIII.—ALKALI BINDING OF PULPS TREATED WITH MATERIALS THAT CHANGED THE HYDROPHILIC NATURE OF THE FIBERS

Treatment	None	Duponol WA	Gelatin	Methyl-cellulose	Locust bean gum
0.01*N* H_2SO_4, cc...	13.40	14.40	12.20	12.90	13.00
Blank NaOH, cc...	0.35	0.35	0.35	0.60	0.60
Corrected H_2SO_4, cc.	13.05	14.05	11.85	12.30	12.40
Normality NaOH in filtrate.....	0.00261	0.00281	0.00237	0.00246	0.00248
NaOH in filtrate, g.	0.0110	0.0118	0.0110	0.0103	0.0104
NaOH bound, g....	0.0079	0.0071	0.0089	0.0086	0.0085
NaOH binding, %	41.8	37.6	47.0	45.5	45.0

The sheets made from tannic acid-mordanted fibers were merely a felted mass. The fibers could be brushed from the sheet by hand. The alkali binding of the shredded handsheets showed a trend of hydrophilic character consistent with the hypotheses advanced. The binding power of the gelatin-treated sheets was too high; however, on rewetting the dried handsheets, the colloidal materials will not revert to their original hydrated state. This is especially true of methylcellulose which must be prepared in an alkaline medium.

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Crown Zellerbach Appoints Forester

Axel J. F. Brandstrom, who, since 1931, has been senior economist for the U. S. Forest Service at Portland, Ore., has resigned in order to take up duties later this summer as forester for the Timber Department of Crown Zellerbach Corporation, Vice President D. S. Denman announced in Seattle today. Mr. Brandstrom will assist E. P. Stamm, logging manager of the corporation. Mr. Brandstrom's headquarters will be in Portland. His duties will be in the extensive timber holdings of the pulp and paper company in the Pacific Northwest.

"We have attracted Mr. Brandstrom to our organization as one of the best equipped men available to further the pioneering job we have been doing in progressive forest management towards placing all our timber properties on a sustained yield basis," said Mr. Denman.

"The program involves harvesting of timber on a rotating crop basis in order to insure a continuing supply of wood for our numerous pulp and paper mills in the Northwest. It will also involve the protection and management of the Company's large ownership of young growing timber. It calls for some tree planting and vigilant fire protection of the replanted and natural re-growth areas. The long-time corporation policy of timber exchange in certain scenic areas will be augmented by a program of replanting some roadside strips already logged along the public highways, and the replanting back from the shorelines of at least one Northwest Lake in order to enhance their scenic value."

A native of Sweden, Mr. Brandstrom received his education and practical experience in forestry and timber management in the Pacific Northwest. He entered the University of Washington in 1915, graduating from the School of Forestry there in 1919. Then followed eight years of practical woods experience in logging construction firms until in 1928 he was appointed to the faculty of the College of Forestry, University of Washington, where he taught logging engineering and allied subjects for three years. In 1931 he was appointed Senior Forest Economist of the U. S. Forest Service, and since has been prominently identified with the study of the economics of forestry, principally in the Pacific Northwest Forest Experiment Station.

Mr. Brandstrom is best known for his studies and experiments in selective logging, both in Douglas fir and the Ponderosa pine region. He is the author of numerous trade journal articles and Government bulletins, best known of which is a bulletin entitled "Analysis of Logging Costs and Operating Methods in the Douglas Fir Region." He is also co-author of a bulletin entitled "Selective Logging Management in the Douglas Fir Region," a bulletin published in 1936 under the auspices of the Charles Lathrop Pack Forestry Foundation. Mr. Brandstrom has also translated several works on Swedish forest practices.

Britain Restricts Use of Paper

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 17, 1940—Disruption of raw material imports for the local paper industry, together with the sharp curtailment in imports of finished paper has led to the adoption of drastic measures in Great Britain to restrict the use of this item, according to a report from the office of the American Commercial Attache, London. Business firms have been urged and the Government has adopted the practice of having letters of more than one page typed on both sides of the paper and carbon copies made on the back of the letters which are answered. With the aid of special stickers, envelopes from incoming mail are being used for the outgoing mail.

It is stated by authorities in the British paper industry that the average British consumption of paper for ordinary private purposes can be cut to 30 per cent without any vital need being affected.

Roehlen Engraving Works Expand

Roehlen Engraving Works, Inc., 324 St. Paul street, Rochester, N. Y., manufacturers of embossing rollers and plates, have started work on another addition to their plant. This structure, the second addition the company has built during the past two years, was necessitated because of the fact that the concern has installed considerable new machinery and added to its personnel to meet the increased demand for its products. The company is now equipped to supply engraved embossing rollers and plates of any size and description and the new building will greatly facilitate deliveries.

Confer Regarding New Kraft Mill

A press despatch from Austin, Texas, under date of July 16, says: "Gov. L. O'Daniel announced today the holding of a conference with William G. Powell, director of the Industrial Bureau of Beaumont, in regard to the project to construct a $25,000,000 pulp and paper mill on the Neches River. The proposed plant would be for the manufacture of kraft paper from yellow pine pulp."

Imports of Paper and Paper Making Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

Effective September 30, 1939, under Treasury Decision 49,970, all publications, exchanges and trade associations, were denied access to import manifests at the New York Customs House. The Paper Trade Journal and other interested parties have vigorously protested this ruling, and as soon as the order of the Treasury Department is modified or rescinded, full publication of all manifests will be resumed in these columns. In the interim, the Paper Trade Journal is making every possible effort to gather all available information from manifests, at various outside sources.

NEW YORK IMPORTS

WEEK ENDING JULY 13, 1940

SUMMARY

Newsprint .....9,423 rolls.
Cigarette Paper .....558 cs.

NEWSPRINT

H. G. Craig Co., Inc., ———, Donnacona, 375 rolls.
International Paper Co., ———, Gatineau, 285 rolls.
H. G. Craig Co., Inc., ———, Donnacona, 317 rolls.
———, ———, Comeau Bay, 7,461 rolls.
H. G. Craig Co., Inc., ———, Donnacona, 363 rolls.
International Paper Co., ———, Gatineau, 284 rolls.
H. G. Craig Co., Inc., ———, Donnacona, 338 rolls.

CIGARETTE PAPER

De Mauduit Paper Corp., ———, Bordeaux, 349 cs.
American Tobacco Co., ———, Bordeaux, 209 cs.

RAGS, BAGGINGS, ETC.

E. J. Keller Co., Inc., *Mormacdove,* ———, 45 bls. old rags.
Green Textile Asso. Inc., ———, Bombay, 350 bls. cotton waste.
Padawer Co., ———, Bombay, 150 bls. cotton waste.
W. Intner, Inc., ———, Bombay, 200 bls. cotton waste.
Camden Fibre Mills, ———, Bombay, 200 bls. cotton waste.
Irving Trust Co., ———, Bombay, 219 bls. old jute rags.
Camden Fibre Mills, ———, Bombay, 200 bls. cotton waste.
E. J. Keller Co., Inc., *Explorer,* ———, 66 bls. colored cotton rags, 65 bls. black cotton rags, 66 bls. white cotton rags.
W. Steck & Co., *Explorer,* Alexandria, 2 bls. rags.

CASEIN

T. M. Duche & Sons, *Mormacdove,* Buenos Aires, 1,417 bags.
G. H. Hammond Co., *Brazil,* Buenos Aires, 1,016 bags.
A. Hurst & Co., *Brazil,* Buenos Aires, 267 bags.

LOS ANGELES IMPORTS

WEEK ENDING JULY 13, 1940

———, *Nitta Maru,* Yokohama, 3 bls. paper hangings.

Foreign Influences On Pulp Industry

In commenting on foreign influences upon the pulp and cotton industries the July 15 issue of *Moody's Stock Survey* says in part: "Germany has pushed the use of rayon in recent years and curtailed the consumption of cotton and higher cost textiles. The reason: Germany could produce and import from Scandinavia large quantities of sulphite wood pulp (the raw material for rayon) more advantageously than it could import cotton or other fibers. The former costs $70 per ton, cotton $200 per ton.

"Germany may acquire control of one of the world's most important sources of wood pulp, Scandinavia, and if victorious over England would dominate the economic life of most of Europe. With Germany controlling Scandinavian pulp supplies (and especially since Russia has certain Finnish pulp mills) there is reason for believing that the totalitarian countries will further expand European use of rayon and staple fiber at the expense of cotton.

"An annual increase of 600 million pounds of staple fiber consumption by the conquered countries would require about 400,000 tons of sulphite pulp. This could easily be supplied by Norway, Sweden and Finland (1939 exports of these countries amounted to over 2 million tons) but represents an amount equal to 57 per cent of the 700,000 tons shipped last year from Scandinavia to the United States.

"The removal of this amount of sulphite pulp tonnage from the world market would prolong the benefits currently enjoyed by the domestic paper and pulp producers having their own pulp supplies. At the same time the adverse effects upon such companies, which have in the past bought their sulphite pulp from Scandinavia, would not be fully relieved.

"Manifestly, all of the foregoing is predicated upon an early termination of the European conflict with Germany victorious and in full control, direct or otherwise, of the economic life of most of Europe. While this discussion has been confined to the possible post-war influences upon cotton and pulp producers, it is chiefly of interest in showing the ramification of the possible effects of the war upon various industries and commodities. Needless to say, repercussions in varying degrees would be felt by other important exporting businesses such as the automobile, meat packing, petroleum, office equipment, chemical, motion picture, machine tool, etc."

Security Container Co. Starts

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., July 15, 1940—DeWitt Brown has announced the organization of a new corrugated box company to be known as the Security Container Company, a division of the Indianapolis Wire Bound Box Company. Mr. Brown is president of both companies, the latter having been in business here for more than 35 years. All modern up-to-date corrugated box equipment has been installed. Dan Langell, for many years associated with the corrugated box industry, is manager of the new company with Ralph W. Burris, widely known to the trade, in charge of sales.

Graphic Arts Men Hold Outing

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., July 15, 1940—The annual outing of the Graphic Arts Institute of Massachusetts and the Graphics Arts Golf Associates of New England enjoyed their annual outing recently at the Belmont Spring Country Club, with 57 golfers attending. A delicious steak dinner was served in the dining room of the club house.

After dinner, John Nicol Mark presented a five-minute dissertation on "New England Philosophy," preceded by twenty minutes of Scotch jokes and wit. Part of the entertainment was Mr. Mark's stentorian voice. Gehman Taylor thanked all who came for golf.

Arthur Cooke announced the prize winners:

Low gross, Grover Daniels (80); low net, Francis Britton (67); most fives, "Cliff" Smith and Robert Thompson; most sevens, A. G. Brooks; kicker's handicap, A. E. Searle, F. G. Lockwood (Knight, Allen & Clark, Inc.), L. R. Mathers (Knight, Allen & Clark), Carl Lethbridge, George Finlay, and Arthur V. Howland (Tileston & Hollingsworth).

"Peg" Norton, Mistress of Ceremonies, then presented a program produced by an entertainment bureau.

Ready to Discuss New Contract

[FROM OUR REGULAR CORRESPONDENT]

CARTHAGE, N. Y., July 15, 1940—Representatives of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers state that they are ready to discuss a new working contract and agreement with officials of the National Paper Products Company whenever the officials desire to hold a meeting. The conference between the representatives of the union locals and mill officials is understood to be overdue. Jacob Stephan, general representative of the international organization, is expected to have a leading role in negotiating for the new contract. Generally, the conference is held about May 1 but has been held up this year because of a series of postponements. Working agreements between employees and employers of other branches, chiefly the St. Regis Paper Company and the Taggart Corporation, have been settled for the ensuing year, it was stated, and it is felt that similar action should be taken at the National Paper Products mill. It is understood from reliable sources that the employees will ask for a vacation with pay as other mills in this section have adopted the plan.

Mark Wilder Celebrates Birthday

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., July 15, 1940 — Mark S. Wilder, for many years prominently identified with the paper mill industry, celebrated his 78th birthday this week and was the recipient of many messages of congratulation. For several years he headed the old Diana Paper Company and later was president of the Remington Paper and Power Corporation and its successor, the Hannah Paper Company, now a part of the St. Regis Paper Company, Inc. He also was former head and controlling factor of the Oswegatchie Power Corporation. He is the owner of a palatial summer home near Alexandria Bay in the Thousand Islands region.

Unions To Celebrate Labor Day

CARTHAGE, N. Y., July 15, 1940—Plans are under way for the annual Labor Day celebration of the Northern New York District Council of Paper Mill Unions which will again be held here, according to announcement last week. The council will conduct the affair in cooperation with the Chamber of Commerce, whose members will aid representatives of the labor unions. All local unions in Northern New York have been requested to send delegates to a meeting to be held here late this month at which preliminary arrangements will be made. Tentative plans for the event are now being made by officers of the council. The celebration this year is expected to surpass the 1939 program. The officers of the council include Ralph O'Marrah, Deferiet, president; Ernest Noakes, Dexter, first vice-president; Deforest Carter, Harrisville, second vice-president; Frank Callahan, Deferiet, third vice-president; Fred Cork, Watertown, fourth vice-president; John Hayes, recording secretary; Clarence Faulds, Watertown, financial secretary; and William Tyo, Norfolk, treasurer.

Buy Paper Under Walsh-Healey Act

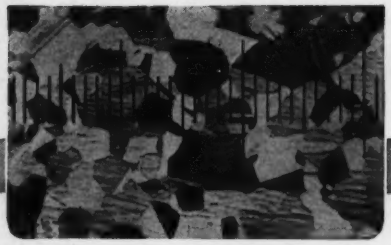
WASHINGTON, D. C., July 17, 1940—During the week ended June 29, the Government purchased $234,251.41 worth of paper and allied products under the Walsh-Healey Act as follows: $18,425.00 worth of toilet paper for War Department from Ashland Paper Mills, Inc., Brooklyn, N. Y.; $24,579.00[1] worth of envelopes for Government Printing Office from Commercial Envelope Company, Inc., Baltimore, Md.; $69,044.00[1] worth of envelopes for Government Printing Office from Oles Envelope Corporation, Baltimore, Md.; $12,600.70[1] worth of envelopes for Government Printing Office from Union Envelope Company, Richmond, Va.; $15,661.80 worth of office supplies for War Air Corps from Crescent Box Corporation, Philadelphia, Pa.; $19,968.91 worth of paper towels for Navy from Resolute Paper Products Corporation, New York; and $73,972.00 worth of blue-print paper for Navy from H. P. Andrews Paper Company, N.Y.C.

[1] Indefinite contract other than General Schedule. Purchases to be made if and when needed.

Astrology and Business

A book on astrology, entitled "Stars Ahead," by Ray and Josephine Smythe, published recently by Binfords & Mort, 40 North Ninth street, Portland, Ore., is an endeavor to present the forecasting of events through astrological deductions, in an understandable manner for the general reader. By means of charts and the use of the business curves of The New York Times and of the Cleveland Trust Company, the authors have presented the subject in a straightforward manner, explaining how planetary influences affect business activity. The contents include a detailed exposition of planetary effects, a study of past business depressions and an analysis of the trend of future business, including the aspects in 1941.

Ray Smythe, who is a member of the Technical Association of the Paper Industry, gave a talk on astrology during the TAPPI convention at Portland, Ore., in 1934.



Measuring the grain size of phosphor bronze wire is one of many assignments at Lindsay which are handled via the microscope.

A Carefulness That Is Microscopic

Many distinct microscopic operations go into our routine in order to assure the quality of the wire we make and the quality of the paper you make. These are in addition to the frequent use of the microscope in phase after phase of research. Over and over again, too, the micrometer does its bit in the interest of accuracy and uniformity. Thus you see, from beginning to end, the minute care that watches over every act in the processing of Lindsay wires. Such are the standards of quality which have been steadily maintained and steadily raised at Lindsay since the company was founded thirty-seven years ago.

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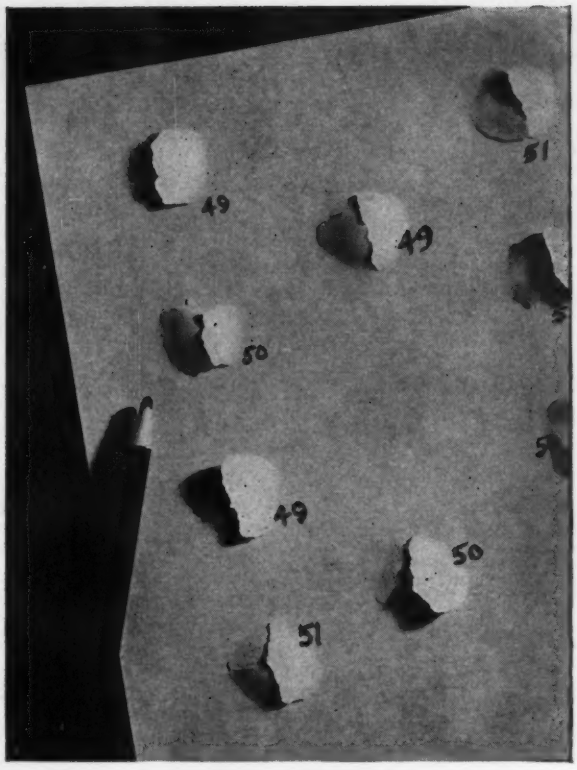

KEEP IT WITHIN SPECIFICATIONS

BENEFITS from adding PQ Silicates to the beater are seen quickly by the skilled eye of the paper expert, but improvements such as strength can be measured as well.

When the stock happens to be variable so that the sheet is sometimes up to and sometimes below test—it pays to use PQ Silicate of Soda. Here's an economical way to get a sheet up to specifications. But the method of use is important, so consult Silicate Headquarters in Philadelphia for the proper procedure.

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New York Paper and Pulp Market Review

Buying In the Wholesale Market Reported A Little More Cautious This Week But Sales Continue High With Shipments For May At High of Year—Better Grades of Kraft Pulp Scarce—Paper-Stock Market Firm.

Office of the PAPER TRADE JOURNAL,
Wednesday, July 17, 1940.

Somewhat more caution in buying has been reported in the wholesale paper market during the current week. Reports from many manufacturers' representatives, jobbers, and general paper merchants, indicate sales of most grades of paper and paper products continue at a high level.

The index of general business activity declined to 100.4 per cent for the holiday week ended July 6, from 103.2 per cent for the preceding week, compared with 86.7 per cent for the corresponding period last year. Among the eight components forming the index, paper production, electric power, miscellaneous car loadings and lumber production were lower, while automobile production and three others were higher, including textile, the latter due to government orders.

Paper production of 247 mills for the week ended July 6 was estimated at 69.6 per cent, compared with 48.6 per cent for 1939, with 58.9 per cent for 1938, with 44.0 per cent for 1937, and with 53.0 per cent for the corresponding week in 1936.

Paper board production for the week ended July 6 was 60.0 per cent, compared with 42.0 per cent for 1939, with 37.0 per cent for 1938, with 44.0 per cent for 1937, and with 53.0 per cent for the corresponding week in 1936.

Newsprint consumption is slightly improved for the week ended July 6, as retail advertising linage rose 2.2 per cent above that of the like period last year. The gain in New York was 1.5 per cent. Total domestic production of newsprint for June was 84,762 tons; total North American production of 430,367 tons, compared with 344,044 tons for the like period last year. Canadian shipments to the United States of 253,390 tons, represented an increase of 45.8 per cent over June, 1939; while overseas shipments were 68,560 tons, an increase of 61.9 per cent.

Manufacturers shipments for May, representing all products, according to the *Industry Survey* issued by the Department of Commerce, rose 2.50 per cent above April; while inventories remained unchanged and no important change in new business was reported.

The index of the value of manufacturers' inventories in paper and allied products was 105.2 per cent for May, compared with 108.0, the high point of the year, and with 93.4 per cent for May, 1939. The index of manufacturers' shipments of paper was 137.3 per cent for May, the highest of the year, compared with 104.3 per cent for May, 1939.

Mechanical Pulp

Production of mechanical pulp continues at a high level. Prices are firm and no important change in the market situation has been reported this week.

Chemical Pulp

Prices remain firm and unchanged on all grades of chemical pulp this week. The higher grades of sulphite pulp are becoming more difficult to obtain and good grades of kraft pulp are reported in some quarters of the trade as scarce.

Rags

Trading in a few grades of paper-making rags continues at a moderate rate of activity, with mill buying reported confined to immediate needs. Prices hold firm and unchanged.

Old Rope and Bagging

The old rope market is reported quiet at this date, with little interest shown by mills. As supplies of Manila rope are limited, the market is strong, with prices holding firm and unchanged.

Demand for old bagging is reported fair this week, with reports from some quarters of the trade indicating limited supplies. Prices are unchanged.

Old Waste Paper

The old waste paper market is firm, under a rather narrow demand from paper and board mills. The only important change in prices reported this week are lower quotations on ledgers; white ledger stock being currently quoted at from 2.00 to 2.15, and colored ledger stock at from 1.60 to 1.70.

Twine

No important change in prices or in the general market situation in twine has been reported this week. Prices continue firm and conform to prevailing market levels.

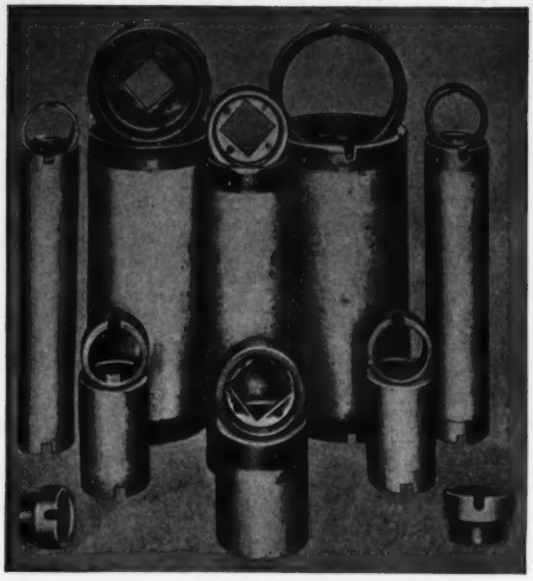
Merchants Paper Corp. Signs Stipulation

WASHINGTON, D. C., July 17, 1940—Merchants Paper Corporation, Chicago, has entered into a stipulation with the FTC that it will discontinue using the word "Manufacturers" as descriptive of its business and will cease stamping, branding or otherwise marking a certificate or any form of certification as "box maker" on boxes or containers not actually made by it; or otherwise, by assertion or implication, representing that it is the manufacturer thereof, or that any statement bearing the name of the corporation is the certified statement of the maker of such box or container. The stipulation points out that the respondent corporation is a jobber and not a manufacturer.

New England Fine Paper Men Meet

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., July 15, 1940—A meeting of the Fine Paper Division of the New England Paper Merchants Association was held Tuesday at the Boston Chamber of Commerce, with Vice-President Frederick G. Lockwood presiding.



ELIXMAN

C Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

A Long draw protected slot caps of heavy gauge steel in all standard sizes.

P Heavy duty caps with reenforced square hole. This new patented feature of reenforcement gives added strength and durability.

S

CORES

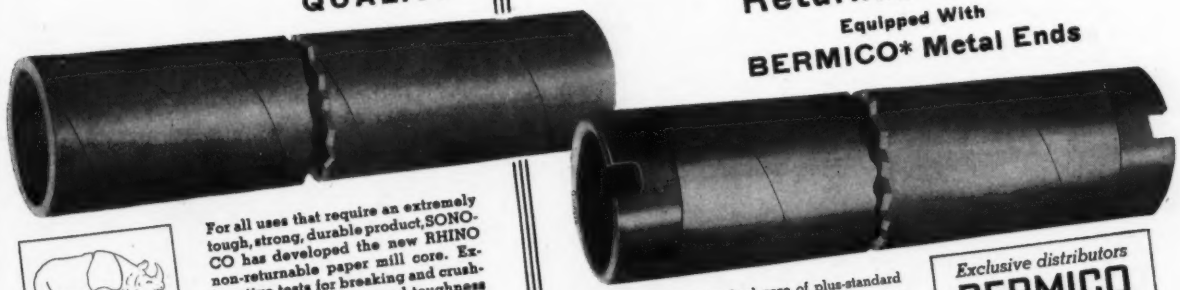
Samples of caps or cores will be gladly submitted.

ELIXMAN PAPER CORE COMPANY, INC.
CORINTH, N. Y.

sonoco PAPER MILL CORES

LOW COST —BETTER QUALITY

Returnable Cores
Equipped With
BERMICO* Metal Ends



RHINO NON-RETURNABLE

For all uses that require an extremely tough, strong, durable product, SONOCO has developed the new RHINO non-returnable paper mill core. Exhaustive tests for breaking and crushing strength and all around toughness indicate its superior qualities.

SONOCO MAKES *EVERYTHING* IN *PAPER CARRIERS*

DURO is a standard core of plus-standard quality. Made from our own especially manufactured paper stock. DURO cores are made standard 3 1/8" I. D. . . These cores are equipped with BERMICO open or closed notch, metal ends to fit 3" shaft. TAYLOR Ends that protect inside of core only, can also be specified.

EN-DURO a super-quality core to meet extra demands for strength and service where needed. This is our highest grade core. All cores will take either BERMICO or TAYLOR Ends which can be furnished lacquered in various colors for easy identification. Both DURO and EN-DURO cores have a thick kraft surface cover.

*(Reg. Trade Mark)

Exclusive distributors
BERMICO (Reg. Trade Mark) **ENDS** *and* **BERMICO** (Reg. Trade Mark) **FIBRE CORES**

Strong cellulose fibres are formed into a homogeneous tube and then especially treated to resist all weather and moisture changes. The Bermico Core is light in weight and extremely hard, strong, rugged. These particular cores have exceptionally long life in either returnable or mill roll service.

SONOCO PRODUCTS COMPANY

BRANTFORD ONT. HARTSVILLE S. C. MYSTIC CONN.

SHIPPING POINTS: LOWELL, MASS. HARTSVILLE, S. C.

DEPENDABLE SOURCE OF SUPPLY

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Wednesday, July 17, 1940.

BLANC FIXE—Quotations on blanc fixe are firm and continue unchanged at prevailing market quotations. The pulp is currently quoted at $35 per ton, in barrels, at works; the powder is currently quoted at $50 per ton, f.o.b., works.

BLEACHING POWDER—Prices on bleaching powder are firm. Demand reported fair to moderate. Bleaching powder is currently quoted at $2 per 100 pounds, in drums at works.

CASEIN—Quotations on casein are firm and continue unchanged at prevailing market levels. Standard domestic casein, 20-30 mesh, is currently quoted at from 13 to 14 cents per pound, 80-100 mesh, at from 13½ to 14½ cents per pound; all prices in bags, car lots. Argentina casein is currently offered at 12 cents per pound. The current quotation of 15 cents per pound on French casein is nominal.

CAUSTIC SODA—Prices on caustic soda are firm and unchanged for the week. Demand continues moderate. Solid caustic soda is currently quoted at $2.30 per 100 pounds; flake and ground at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations on china clay are firm and are reported unchanged for the week. Domestic filler clay is currently quoted at from $7 to $15 per ton; coating clay at from $11 to $22 per ton, at mines. Imported clay is currently quoted at from $13 to $25 per long ton, ship side.

CHLORINE—Prices on chlorine are firm. The market position is reported strong for the week. Prices are unchanged. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The rosin market is reported firm for the week. Quotations are a little lower at this date. "G" gum rosin is currently quoted at $3.25 per 280 pounds, gross weight, in barrels, Savannah. "FF" wood rosin is currently quoted at $3.15 per 280 pounds, gross weight, in barrels, New York. Seventy per cent gum rosin size is currently quoted at $2.25 per 100 pounds, f.o.b., shipping point.

SALT CAKE—Quotations on salt cake are firm and nominal. Shipments steady. Domestic salt cake is currently quoted at $17 per ton, in bulk; chrome cake at $16 per ton; all prices in car lots, f.o.b., shipping point. The quotation of $20 per ton on imported salt cake is nominal.

SODA ASH—Prices on soda ash are firm and continue unchanged at prevailing market levels. Demand reported fair at this date. Quotations on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Quotations on corn starch are firm and are reported a little lower for this week. Pearl is currently quoted at $2.80 per 100 pounds; powdered starch at $2.90 per 100 pounds; all prices in bags, car lots, f.o.b., works.

SULPHATE OF ALUMINA—Prices on sulphate of alumina are firm. Shipments reported steady for the week. The commercial grades are currently quoted at $1.15; iron free at $1.60 per 100 pounds; all prices in bags, car lots, f.o.b., works.

SULPHUR—Quotations on sulphur are firm and conform to prevailing market prices. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are offered at $19 per ton.

TALC—Prices on talc are firm and continue to conform to prevailing market levels. Domestic talc is currently quoted at from $15 to $21 per ton, at mines. Prices on imported talc are nominal.

MARKET QUOTATIONS

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	"	—
Kraft—per cwt.—Delivered Zone A			
Northern, Extra Quality	$5.25	@	$5.75
Superstandard	4.87½	"	5.25
Northern Standard Wrapping	4.37½	"	4.62½
Standard Wrapping	4.25	"	—
Tissues—Per Ream—Carlots			
White No. 1	.97½	"	—
White No. 1 M. G.	.95	"	—
White No. 1½	.80	"	—
White No. 2	.75	"	—
Anti-Tarnish M. G.	.80	"	—
Colored	.85	"	—
Kraft	.87½	"	—
Manila	.77½	"	—
Unbl. Toilet, 1 M.	3.75	"	—
Bleached Toilet	5.26	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	2.10	"	—
Bleached, Jr.	3.60	"	—
Manila—per cwt.—C. l. l. a.			
No. 1 Jute	8.25	@	10.25
No. 1 Manila Wrapping, 35 lb.	5.25	"	—
No. 2 Manila Wrapping, 35 lb.	5.00	"	—
Boards, per ton—			
News	35.00	@	40.00
Chip	35.00	"	40.00
Sgl. Mla. Ll. Chip.	55.00	"	57.00
White Pat. Coated	67.00	"	70.00
Kraft Liners	55.00	"	—
Binders Boards	73.00	"	80.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—
White, Assorted Items,
Delivered in Zone 1:

	Bonds		Ledgers	
100% Rag Ext. No. 1	$39.10 @	$46.00	$40.25 @	$47.25
100% Rag	31.05 "	36.50	32.20 "	37.75
85% Rag	.... "	....	29.90 "	35.00
75% Rag	23.60 "	27.75	24.75 "	29.00
65% Rag	.... "	....	21.65 "	26.25
50% Rag	17.55 "	21.50	18.70 "	22.75
25% Rag	14.65 "	17.75	15.80 "	19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—
White, Assorted Items,
Delivered in Zone 1:

	Bonds		Ledgers	
No. 1	$8.95 @	$11.00	$10.10 @	$12.25
No. 2	8.05 "	9.75	9.25 "	11.25
No. 3	7.60 "	9.25	8.50 "	10.75
No. 4	7.30 "	9.00	8.50 "	10.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—
White, Cased Paper,

Delivered in Zone 1:

No. 1 Glossy Coated	$11.90	@	$13.50
No. 2 Glossy Coated	10.35	"	11.75
No. 3 Glossy Coated	9.55	"	11.00
No. 4 Glossy Coated	9.15	"	10.50
No. 1 Antique (watermarked)	8.35	"	9.50
No. 2 Offset	7.70	"	9.00
A Grade E. F.	7.50	"	8.75
A Grade S. & S. C.	7.75	"	9.00
B Grade E. F.	6.95	"	8.00
B Grade S. & S. C.	7.20	"	8.25
C Grade E. F.	6.65	"	7.75
C Grade S. & S. C.	6.90	"	8.00
D Grade E. F.	6.40	"	7.50
D Grade S. & S. C.	6.65	"	7.75

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	Nominal		
Dry	Nominal		
(Delivered)			
No. 1 Domestic and Canadian	40.00	@	45.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	3.72½	@	4.50
Prime Qualities—			
Easy-Bleaching Sulphite	3.17½	"	3.75
Strong Unbleached Sulphite	3.17½	"	3.75
(On Dock, Atlantic Ports)			
Kraft Bleached	4.00	"	4.50
Kraft Light & Strong	3.50	"	3.75
Kraft No. 1	3.25	"	3.60
(F. o. b. Pulp Mill)			
Kraft Domestic and Canadian	3.25	"	3.60
(Delivered)			
Soda Bleached	2.90	"	3.30

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	7.00	@	7.25
Silesias No. 1	4.60	"	4.75
New Unbleached	6.75	"	7.00
Blue Overall	4.50	"	4.75
Fancy	3.25	"	3.50
Washables	2.00	"	2.15
Mixed Khaki Cuttings	2.75	"	3.00
O. D. Khaki Cuttings	3.15	"	3.35

Old Rags

White, No. 1—			
Repacked	3.25	"	3.50
Miscellaneous	2.75	"	3.00
White, No. 2—			
Repacked	2.50	"	2.75
Miscellaneous	2.00	"	2.25
Thirds and Blues—			
Repacked	2.00	"	2.25
Miscellaneous	1.75	"	1.90
Roofing Rags—			
No. 1	1.10	"	1.15
No. 2	.85	"	.90
No. 3 (bagging)	.90	"	1.00
No. 4	.60	"	.65
No. 5A	.60	"	.65

Foreign Rags

All prices nominal

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxford	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—

KALAMAZOO ★

Glazed Tile TANKS

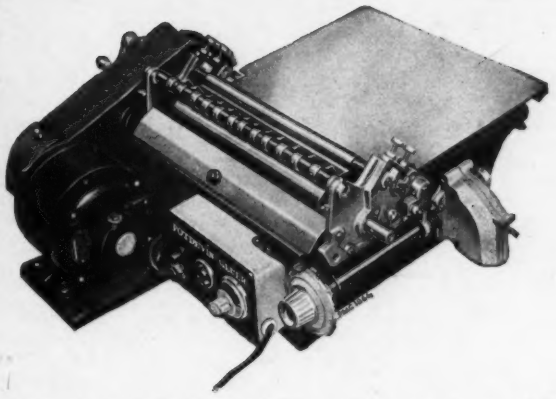
As permanent as reinforced concrete—and cost less. First tanks built show no deterioration today and are as clean as when first erected.

Manufacturers of wood tanks for 60 years

GLAZED TILE — KALAMAZOO TANK & SILO CO. — WOOD

KALAMAZOO MICHIGAN

For Your **FINISHING ROOM . . .**



POTDEVIN GLUERS

for machine gluing labels, trim strips and tight wraps for paper boxes and for all those short run pasting and gluing jobs—labeling paper rolls, shipping packages, etc.—which consume so much time.

POTDEVIN MACHINE CO.
EST. 1893
1223 38TH ST. BROOKLYN, N.Y.

POTDEVIN

WATERBURY FELTS

Are Made By

H. WATERBURY & SONS CO.

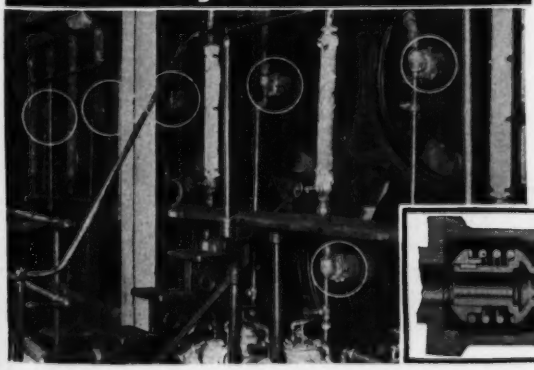
ORISKANY, NEW YORK

SCREENS *of Perforated Metal*

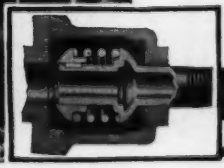
The Harrington & King PERFORATING Co.

5652 FILLMORE ST., CHICAGO, ILL. 114 LIBERTY ST., NEW YORK, N.Y.

These are good stairs — but —



THEY WON'T BE NEEDED NOW!



• At least no one will need to climb them for inspecting, packing, oiling and adjusting the stuffing boxes; for this is one of the many paper machines where Johnson Rotary Pressure Joints have ended stuffing box troubles. The sectional view shows the basic construction of these Johnson Joints. Two special, self-lubricating carbon graphite rings form the bearings and pressure seal. Sealed by the pressure, they are self-adjusting. Equally important is the ball and socket design and the annular space around the outlet which provides for angular or lateral misalignment —greatly increasing joint life.

There is a Johnson Joint for every machine with every type of drainage—a joint that will save time, power, and step up production. Ask for latest bulletins.

THE JOHNSON CORPORATION

828 WOOD STREET — THREE RIVERS, MICH.

No. 4 White Linens	2.25	@	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.75	@	3.00
Domestic	2.50	"	2.75
Wool Tares, light	2.00	"	2.25
Wool Tares, heavy	2.12½	"	2.25
Bright Bagging	2.25	"	2.50
Manila Rope—			
Foreign	4.25	"	4.50
Domestic	3.75	"	4.00
Jute Threads	2.62½	"	2.75
Sisal Strings	2.10	"	2.35
Mixed Strings	1.10	"	1.20

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	3.10	@	3.25
Ordinary Hard White No. 1	2.25	@	2.50
Soft White No. 1	1.80	"	1.90
Soft White Extra	2.50	"	2.60
Flat Stock—			
Stitchless	1.10	"	1.25
Overissue Mag	1.00	"	1.10
Solid Flat Book	1.02½	"	1.07½
Crumbled No. 1	.70	"	.75
Ledger White Stock	2.00	"	2.15
Ledger Stock Colored	1.60	"	1.70
Manila—			
New Env. Cut	1.70	"	1.80
New Cuttings	1.30	"	1.40
Old Kraft Machine Compressed bales	1.75	"	1.85
News—			
No. 1 White News	1.75	"	1.90
Strictly Overissue	.70	"	.75
Strictly Folded	.60	"	.65
Corrugated	.72	"	.77½
No. 1 Mixed Paper	.47½	"	.52½

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.19½	@	—
White Hemp	.19½	"	—
Fine Polished—			
Fine India	.24	"	—
Unpolished—			
Box	.15	"	—
Paper Makers	.15¾	"	—
Tube Rope	.17	"	—
Wall Paper	.16	"	—
Wrapping	.18¾	"	—
Soft Fiber Rope	.16¾	"	—
Cotton	.21½	"	—
(Hard Fiber)			
Medium Java	.20	"	—
Mex. Sisal	.17	"	—
Manila	.24¾	"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f.o.b. Phila.)

Shirt Cuttings—			
New White No. 1	.07¼	@	.07½
New White No. 2	.04	"	.04½
Light Silesias	—	"	.04½
Silesias, No. 1	—	"	.04½
Black Silesias, soft	—	"	.03¾
New Unbleached	.05½	"	.06
Washable, No. 1	—	"	.04
Blue Overall	.04½	"	.05
Cottons—According to grades—			
Washable No. 2	—	"	.01¾
New Blue	—	"	.01¾
Fancy Percales	—	"	.03
New Black Soft	—	"	.04
New Light Seconds	.04½	"	.05
New Dark Seconds	—	"	1.55
Khaki Cuttings—			
No. 1 O. D.	.03½	"	.03¾
No. 2 Mixed	.02½		.02¾
Corduroy	—	"	.03
New Canvas	.05½	"	.06
New Black Mixed	—	"	.03

Domestic Rags (Old)

White No. 1—			
Repacked	3.25	@	3.75
Miscellaneous	2.50	"	2.75
Thirds and Blues—			
Miscellaneous	1.55	"	1.65
Repacked	1.75	"	2.00
Black Stockings (Export)	3.50	"	4.00
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	.90	"	1.00
Domestic No. 2	—	"	.80
Roofing Bagging	—	"	.70

Bagging

(f.o.b. Phila.)

Gunny, No. 1—			
Foreign	Nominal		
Domestic	2.25	@	2.75
Manila Rope	—	"	4.50
Sisal Rope	1.75	"	2.00
Mixed Rope	.75	"	1.00
Scrap—			
No. 1	2.50	"	2.75
No. 2	1.10	"	1.15
Wool Tares, heavy	3.50	"	3.70
No. 1 New Light Burlap	3.00	"	3.50
New Burlap Cuttings	2.00	"	2.25

Old Papers

(f.o.b. Phila.)

Shavings—			
No. 1 Hard White	2.50	@	2.55
No. 2 Hard White	2.10	"	2.15
No. 1 Soft White	2.00	"	2.10
No. 2 Soft White	1.60	"	1.75
No. 1 Mixed	.90	"	1.00
Solid Ledger Stock	1.90	"	2.00
Ledger Stock, white	2.00	"	2.10
Ledger Stock, colored	1.50	"	1.60
No. 1 Books, heavy	1.10	"	1.15
Manila Cuttings	1.90	"	1.95
Print Manila	.65	"	.70
Container Manila	.55	"	.60
Kraft Paper	1.70	"	1.75
No. 1 Mixed Paper	.40	"	.45
Straw Board Chip	.40	"	.45
Binders Board Chip	.40	"	.45
Corrugated Board	.70	"	.75
Overissue News	.75	"	.80
Old Newspapers	.55	"	.60

BOSTON

Old Papers

(f.o.b. Boston)

Shavings—			
No. 1 Hard White	2.75	@	3.15
No. 1 Soft White	2.00	"	2.25
No. 2 Mixed	.75	"	.80
Solid Ledger Books	1.50	"	1.75
Overissue Ledger Stock	1.75	"	2.00
Mixed Ledgers	.85	"	.90
No. 1 Books, heavy	1.10	"	1.25
No. 1 Books, light	.65	"	.75
Crumpled Stitchless Book Stock	.55	"	.65
Manila Env. Cuttings	1.85	"	2.00
Manila Envelope Cuttings, extra quality	2.35	"	2.60
White Blank News	1.40	@	1.50
No. 1 Kraft	1.40	@	1.50
Extra No. 1 Kraft	1.60	"	1.90
Mixed Papers	.45	"	.50
Print Manila	.50	"	.55
Container Manila	.60	"	.70
Old Newspapers	.50	"	.55
Paper Wool Strings	.95	"	1.25
Overissue News	1.00	"	1.10
Box Board Chips	.40	"	.45
Corrugated Boxes	.55	"	.65
Kraft corrugated boxes	1.25	"	1.40
New Kraft Cuttings	2.00	"	2.25
Screening Wrappers	.60	"	.70

Bagging

(f.o.b. Boston)

Gunny Bagging—			
Foreign	2.75	@	—
Domestic	2.25	"	2.50
Sisal Rope	2.25	"	2.50
Mixed Rope	.85	"	1.00
Transmission Rope—			
Foreign	2.50	"	2.60
Domestic	2.40	"	2.50
Soft Jute Rope	3.00	"	3.25
Manila Rope—			
Foreign	4.85	"	5.10
Jute Carpet Threads	1.50	"	1.75
Gunny Bagging—			
Foreign	2.75	"	2.85
Domestic	2.25	"	2.50
Bleachery Burlap	4.00	"	3.25
Scrap Burlap—			
Foreign	2.40	"	2.50
Domestic	2.50	"	—
Scrap Sisal	2.25	"	2.50
Scrap Sisal for Shredding	2.30	"	2.65
Wool Tares, Heavy	2.40	"	2.50
New Burlap Cuttings	3.75	"	4.00
Aust. Wool Pouches	3.00	"	3.15
Heavy baling bagging	2.25	"	2.40
Paper Mill Bagging	1.75	"	2.00
No. 2 Bagging	.75	"	.80

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	—	@	.03
Fancy Percales	.04	"	.04¼
New White No. 1	.07½	"	.07¾
New Light Flannelettes	.05	"	.05¼
Canton Flannel, Bleached	.07	"	—
Silesias No. 1	.05	"	—
New Black Silesias	3.20	"	3.25
Soft Unbleached	.07	"	.07½
Blue Cheviots	.05	"	.05½
Fancy	.02	"	.02½
Washable	.02	"	.02½
Cottons—According to Grades—			
Blue Overalls	.04¾	"	.05
New Black, Soft	.03	"	.03¼
Khaki Cuttings	.03	"	—
O. D. Khaki	.03	"	.03½
Corduroy	.02¾	"	.04
New Canvas	.06¼	"	.07¼
B. V. D. Cuttings	.07	"	.07½

Domestic Rags (Old)

(F. o.b. Boston)

White No. 1—			
Repacked	2.75	"	3.75
Miscellaneous	2.40	"	2.60
White No. 2—			
Repacked	1.90	"	2.00
Miscellaneous	2.00	"	2.25
Twos and Blues	1.50	"	2.00
Old Blue Overalls	1.60	"	2.00
Thirds and Blues—			
Repacked	—	"	1.25
Miscellaneous	—	"	1.00
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.00	"	1.25
No. 2	—	"	1.10
No. 3	—	"	.90

Foreign Rags

(F. o. b. Boston)

Canvas	.04¼	@	—
Dark Cottons	(nominal)		
Dutch Blues	(nominal)		
New Checks and Blues	(nominal)		
Old Fustians	(nominal)		
Old Linsey Garments	(nominal)		
New Silesias	(nominal)		

CHICAGO

Waste Paper

(f.o.b. Chicago)

Shavings—			
No. 1 White Envelope cuttings	3.15	@	—
No. 1 Hard White	2.50	"	2.65
No. 1 Soft White	2.00	"	2.20
Ledger and Writings	.85	"	.95
Solid Books	.95	"	1.10
Blanks	1.50	"	1.60
Krafts	1.40	"	1.50
New Kraft Cuts	1.60	"	1.75
Overissue News	1.00	"	1.10
Old Newspapers—			
No. 1 Folded News	.70	"	.80
No. 1 Mixed Paper	.40	"	.50
Roofing Stocks—			
No. 1	.95	@	1.00
No. 2	.85	"	.90

MINIMUM WAGE COMMITTEE

(Continued from page 18)

Frank Grasso, United Paper Workers Industrial Union (C.I.O.), New York.

Burt J. Mason, U.P.W.I.U. (C.I.O.), Chicago.

Ray Thomason, Regional Director, C.I.O., Richmond, Va.

The definition of the Pulp and Primary Paper Industry of Administrative Order No. 41, referred to, follows:

"The manufacture of pulp for any purpose, from fibrous material capable of yielding cellulose fiber and the manufacture of paper and of board from such pulp and from such fibrous material or either of them with or without addition of any non-cellulose fiber, colorant or filler.

"The term 'manufacture' means all operations involved in the production of pulp, paper, and board, starting with the unloading of raw materials at the mill site and ending with the delivery of the finished paper or board to carriers for sale as such or to converting departments within the same mill or company. It includes finishing operations performed in the paper or board mill, such as packing, trimming, cutting to size, sorting, plating, sizing, super-calendering, and other processing, but does not include any treating, processing or refabrication of finished paper or board to produce converted paper or board products.

"The definition of the pulp and primary paper industry covers all occupations in the industry which are necessary to the production of the articles specified in the definition, including clerical, maintenance, shipping and selling occupations."

Any recommendation of the committee will be the subject of a public hearing at which interested parties may appear and testify before a wage order carrying out the recommendation is issued.